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THE PRACTICAL TEACHER

OCT. 1907

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EDUCATIONAL OPINION

GENERAL NOTES.

THE outline scheme of a possible Education Bill for 1908 propounded by the *Tribune*, on which we touched in our last issue, has produced a stirring correspondence: proof positive that in spite of oceans of talk and reams of writing on the subject during the last five years, the topic is of perennial interest—probably because it touches so many interests. In one respect the *Tribune* has effected a new departure. The stagnant time during which Parliament no longer talks, and the movable population migrates to the seaside or to the moors, generally brings a visit from the sea-serpent, or the advent of the big gooseberry, or the preternaturally sagacious poodle. Instead of that we have columns of ardent correspondence on the most burning topic of the day, with the quick thrust and parry of contrary opinions. The editor of the *Tribune* is to be congratulated on a very shrewd move—a move which may prove of real utility.

The "Silly Season" utilised.

IT is significant that each of the five paragraphs which constitute the *Tribune's* brief Bill treats of some aspect of the horrid crux of all Education Bills in England—the religious question. It may serve as a *ballon d'essai*, and, by giving opportunities for all and sundry to express their opinions and propound rival schemes, produce evidence as to the minimum or maximum of agreement possible between contending educational parties. In which case the "silly season" of 1907 will be "twice blessed."

A "Test" Bill.

In this connection it is well to note the discussion in the Trades Union Congress at Bath on education, when the question of a final solution of the difficulty in the shape of a Bill providing for purely secular education was debated. The sincerity of the education combatants is undeniable. Is there no neutral ground on which they can lay down their arms?

MODERN progress is responsible for many things which at first sight do not seem to indicate progression. The railway was responsible for an alteration in the spelling of the names of many places in England, either through an economy of the directors in the matter of paint, or from a desire to anticipate President Roosevelt and phoneticise language. Then came along the extension of the telegraph, which went further in the same direction. Superfluous letters in place names were omitted, double letters crushed into a single one, and in some cases terminations quite changed in appearance. Now follows the telephone. But the telephone can't affect written language. It proposes, however, beginning in Philadelphia, according to the decree of the Telephone Company there, to suppress the word "please." First spelling, then politeness, suffers in the march of progress. Some ingenious person in the company's employ has calculated that nearly one million "pleases" are called over the telephones in Philadelphia daily, involving a "waste" of one hundred and twenty-five hours. A personal experience of America did not impress us by the excessive use of "please;" but we failed to visit Philadelphia, which may account for our disappointment. If the decree of the company becomes effective, the "City of Brotherly Love" will soon conform to the general standard of politeness in the States; and the old-fashioned "twopence extra per week for manners" will need reviving.

The Euthanasia of "Please."

AT the recent Congress on School Hygiene held in London, one of the most interesting presentations was the book presented by Professor Palmberg on behalf of Finland. It is a beautifully got up booklet of 120 pages, containing a brief but full description of the school institutions of the country first of all, and then short monographs on the hygienic and special instruction given throughout Finland. Each report is written by the inspector or official in charge of the work, so that the book forms a mine of information for the interested inquirer. Illustrations and plans are lavished throughout, and the whole is in English—astonishingly good English, in spite of a few errors in spelling, which are natural enough to a foreigner. The Grand Duchy, with whose political fortunes every Englishman must sympathise, is strikingly alert and progressive in the matter of education, and contains things which England might well copy. One of the most noteworthy things in Professor Palmberg's book, to which we shall have occasion to return later, is the description of the special school for *deformed* children in Helsingfors, the capital.

From the Hygienic Congress.

ALL newspaper readers are familiar with the question which recurs periodically when interest in some journal needs resuscitating. And many are familiar with the various "guides" published from time to time professing to assist the bewildered parent in his search for a vocation for his son and heir. Germany is more business-like. In Berlin there is an Academic Inquiry Office, with twelve departments, situated in the university buildings, where information is collected and tabulated, and inquiries can be answered. Among the classes of information collected we find such things as—vocations in Germany, necessary courses of study, tests, examinations, prospects, courses for general public instruction, Berlin high schools, libraries, museums, etc., holiday courses at home and abroad, education of women, etc., etc. It bids fair to become a very practical intelligence office of education, as well as a help to bewildered parents. The minute classification and the thoroughness of the work are eminently Teutonic. Its usefulness must be immense, and, as foreigners are allowed to participate, cosmopolite.

What shall we do with our Children?

DR. ZAMENHOF'S description of the first beginnings of Esperanto is full of interest. The bickerings and animosities which arose out of the diversity of tongues in Bielostok, his native town, prompted him to search for some means of evolving harmony from this discord. His efforts to use Hebrew and then Yiddish led him

Esperanto—

BRITISH MUSEUM

to the conviction that a general language must be one that is not the possession of any one existing people, but a neutral tongue. Hence the fabrication of Esperanto. The writer, who has just returned from a long journey in out-of-the-way regions of Europe, had ample opportunity of estimating the value of a common medium of intercourse. On one occasion, when the guest of a professor of a northern university, *five languages* were going round the table at one and the same time. On another occasion, in desperate straits, he conversed in German with a helpful native, chance met, who replied in Swedish. Neither speaker possessed the language used by the other, but desperation quickened intelligence, with the happiest results. What a chance for Esperanto!

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or English?

COMPARING experiences with a fellow traveller, an English army captain, the latter, whose stock of European languages was small, declared that he had been forced to fall back on *Hindi* when in difficulties a few days before, which, to his astonishment, was understood by the person to whom he spoke. Strange as it may seem, he had had a similar experience a few years before in crossing from Almeria to Oran in a wretched little Spanish boat. The only medium of intercourse between himself and the captain was *Hindi*. There are unlimited worlds for Esperanto to conquer. But it has a great rival in English, which is taught in schools in nearly every European country, and in some of them compulsorily. No captain of a vessel in Finland, whether sea-going or lake-going, can obtain his master's certificate without producing evidence of acquaintance with English. And leaving the port of St. Petersburg, the writer overheard a Russian passenger conversing with the captain in English, having no Finnish or Swedish at command. It makes one ask, "Which is going to win—English or Esperanto?"

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An Opportunity for the Schools.

WHY is it that the English nation, as a whole, spite of its lavish patronage and appreciation of music, possesses such limited talents in the matter of choral singing, especially in the singing of the national and folk songs, of which there is no lack? Sailing across the Lake of Constance from Constance to Bregenz, the writer had as companions a gathering of young Swiss fellows, quite of the commonplace type, who made the journey melodious with Swiss folk songs, sung in parts. A similar collection of young Englishmen would either have been dumb, or if they had sung, their *repertoire* would have been airs from pantomimes or musical comedies. Again, from Copenhagen to Abo, a few young holiday-making Finns made most charming music by singing in parts the songs of their native land. And in each case the singing was evidently a source of great pleasure to the singers, done quite simply, without any affectation. Similar experiences are quite common in Germany, as many a traveller can witness. Now, all tradition to the contrary notwithstanding, the Englishman is *not* an unmusical beast. He possesses a rich collection of characteristic national songs, and he is often endowed with a pleasing voice, while he also loves good music. How is it, then, that he seldom makes the joyful noise which his Continental cousins so sweetly raise?

N.U.T. NOTES.

A Criticism or so—

THE Executive of the National Union of Teachers does not meet in August, its members, as well as such of the officials as can get away from Russell Square, taking a well-earned rest wherever fancy leads them. On account of the recess, then, three or four brochures of "Regulations" issued in July could not be considered until the September meeting; and of these, naturally those relating to training colleges and secondary schools received the most attention.

As the man whose privilege it was to move the resolution at the Scarborough Conference demanding a "conscience clause" for training colleges, I am naturally delighted to see the introduction of Article 8 (*d*):—

> "In no circumstances may the application of a candidate be rejected on the ground of religious faith, or by reason of his refusal to undertake to attend or to abstain from attending any place of religious worship, or any religious observance or instruction in religious subjects in the college or elsewhere; nor on the ground of social antecedents or the like."

And this, of course, from no sort of hostility to the Church of England or any other denomination, but in the interests of a *free profession*. I wish I could be as whole-hearted in my admiration of the policy and administration of the President of the Board of Education as some of my *confrères*. Yet it does seem to me that many of the far-reaching, almost revolutionary, reforms introduced by Mr. M'Kenna are what I should describe as purely *political;* and although one agrees with his vigorous crusade against private management of state-aided and rate-aided educational institutions, one would like to see some evidence of his desire to improve education *per se*, as well as to forward the professions of a great party.

The modification of the "Students' Declaration" has long been asked for by the Union, and no reasonable individual can object to its present form, which is sufficiently comprehensive to cover service in practically any kind of school. The ridiculous embargo against degree courses is still maintained, and not for the life of me can I understand why all matriculated students who satisfy the college authorities that they are able to profit by such courses without loss to their professional work are not allowed to proceed to a degree. The foolish regulation that those students who fail at their final degree examination must take the Acting Teachers' Examination within two years is still maintained. Surely recognition as certificated teachers for *these* students might properly depend on the report of the training college authorities on their work in college.

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on Recent "Regulations."

THERE is much in the Secondary Regulations for 1907–8 to command one's approval, and attention has already been directed to certain points in last month's *Practical Teacher*. But the Executive has sent a forcible and emphatic protest to the President of the Board of Education against the payment of any grant whatever on account of scholars in classes below the ordinary secondary school course. Some of the reasons for this protest are:—(1) No child should be admitted to a secondary school who is not educationally fit to

commence the secondary school course; (2) children in preparatory classes take up the accommodation required for those able to profit by the proper secondary school course; (3) grants for preparatory classes are payments on account of primary instruction given in a secondary school to those children whose parents can afford to pay a fee. The Executive are of opinion that the recognition by the Board of Education of preparatory classes, and the payment of grants for the instruction given therein, is the worst possible way of accomplishing the object set forth in paragraph 10 of the Prefatory Memorandum—that is, "to give greater freedom to local authorities in their arrangements for linking up public elementary and public secondary schools, and thus advancing towards a unified system of public education." The chances are that the new Regulations will have a diametrically opposite effect, and it is at least odd to see our English Board introducing a system which, having been tried for thirty years in certain Continental countries, is now being abandoned as a failure. Certain paragraphs in the Prefatory Memorandum seem to rest on such slender foundations that I hope later on to see Sir Robert Morant (or whoever may be responsible for them) compelled to furnish the evidence on which they are based. I refer to such statements as: "It is the experience both of school authorities and of the Board's Inspectors that scholars who have entered the secondary school at the age of ten or eleven have been able to take fuller advantage of the instruction provided for them at a later stage, and to make more satisfactory progress in it, than those who did not enter the secondary school until the age of twelve or thirteen."

I hope to refer to this subject again next month.

A. C.

NOTES FROM THE NORTH.

AS I anticipated, the fifth Education (Scotland) Bill has shared the fate of its predecessors. The loss of these Bills has had a most detrimental effect on the question of educational administration. Whenever a Bill was introduced, School Boards stayed their hands with regard to school building and other matters of equally pressing importance. So that the general opinion is that the Government would be well advised to introduce no new Bill until it has made up its mind definitely that it intends to pass it into law during the session. Two professional questions, too, have suffered very much from the repeated failures of Parliament. These are Superannuation and Tenure. Some of the clauses of the Bill may yet be passed by means of Departmental Minutes, but these two questions require parliamentary action. The question of tenure has during the past year caused the Institute's Committee much anxious deliberation, and at the present time several notices of dismissal have been issued by School Boards and managers of voluntary schools. Since the beginning of the holidays ten individuals have been affected, against only one of whom was there any attempt to impute fault in connection with the discharge of school duties, and even in that case the teacher's demand for investigation was refused. The other notices have arisen principally from ecclesiastical jealousies, changes connected with the grading of schools, or a desire to keep down the rates. Of these cases four are still pending, in five a settlement more or less amicable has been arrived at, while in one valuable concessions have been secured for a voluntary teacher who did not contemplate the permanent retention of his post.

The Tenure Problem.

* * *

WHEN it was found that no mention of tenure was made in the recent Bill, the Educational Institute called attention to the fact; but, in view of the great desire to get the superannuation question settled, did not press the matter too strongly. They did not wish to increase the difficulty of the Government, but I feel certain that during the coming winter they will be constrained to put this subject in the forefront of their programme. There can be little doubt that the introduction of larger areas would be the best solution of the problem, but in some quarters that is considered very far off. In the event of the larger areas not being conceded, something must be asked for in the meantime. The desire for a court of appeal gains strength. By many it is believed the Scotch Education Department would be willing to undertake this work, and it would certainly be a step in the right direction. Anything is preferable to the present condition of affairs. It has been suggested that if difficulty be experienced in getting the Department to act for the whole of the profession, a beginning might be made with regard to the tenure of the principal teacher. In the great majority of cases that have come under the notice of the Institute, it has been the principal teacher who has been aimed at. If that point were gained, in time it might be possible to extend its application to all members of the profession. Recent legislation—particularly departmental—has laid upon the principal teachers much more onerous and delicate work in connection with the recommendation of junior students. If the principal teacher offends some member of the small School Board, he is likely to have his position made very uncomfortable. The question of tenure is therefore one upon which the Institute must speak courageously during the coming winter.

The Institute and the Question.

* * *

DURING the year the various branches of the Institute have been giving their attention to certain important questions dealing with the education of infants and girls. These questions were drawn up by the Ladies' Committee of the Institute. The various replies received were considered, and the following conclusions come to:—Infants' hours should be not more than four hours a day, inclusive of the time for religious instruction, and divided into two sessions by a midday interval; the infants' curriculum should be of such a nature as to develop all the powers of the child's mind and body—in particular, to train the observation rather than to give instruction (small classes taught in suitable classrooms by an adequate staff would meet these requirements better than any great changes in present curriculum); promotion should be dependent on attainment, not age, while age should not rule the standard of any child's attainments. In regard to Supplementary and Continuation Classes, the present curriculum was generally approved of, while the following suggestions were made:—That centres for domestic training should be more general throughout the country; and that women teachers who do not

The Ladies' Committee of the Institute.

intend to graduate should be encouraged to qualify as teachers of cookery, household management, etc. The subjects proposed for discussion by the branches next year are the Junior and Senior Departments—their aim, methods, staffing, and organisation.

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The Institute's Finances.

AS was expected, there has been a great addition to the membership of the Institute, the actual number of new members being 2,629. Almost every branch shows an increase, the largest numbers being those of Glasgow, 790; Stirling, 213; Edinburgh, 177; Fife, 164; Dundee and Hamilton, 157 each; Ayrshire, 123. But even the smaller associations show in many cases a better proportional increase. The funds, as a result, are in a very healthy state. The Institute has been able to carry forward £433, 7s. 6d. to its capital account, this notwithstanding the great increase in expenditure which has taken place during the past year. The Benevolent Fund this year also shows a surplus of £137, 4s. 6d., so that there is a total credit balance to the year's accounts of £570, 12s.

The state of funds as at July 2 shows that there is in the General Fund £6,182, 4s. 4½d., and in the Benevolent Fund £1,916, 5s. 10d., making a total of £8,098, 10s. 2½d.; so that if prosperity is to be measured by the increase of membership and the amount of funds in hand, it may safely be said that the Institute has at the present time reached its highest point. It is to be hoped, however, that an effort will still be made to bring all the teachers of Scotland within its pale, for numerical strength goes a long way in the eyes of the public.

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Libraries for Country Schools.

MR. JAMES COATS of Paisley for several years gave gifts of libraries to Highland villages; but for the last year he has been giving libraries to schools where the pupils are hindered by lack of the inspiring aid of books for general reading, and especially where there are Continuation or Supplementary Classes, and the resources of the people or managers of the schools are limited. In addition to supplying libraries, he has given bookcases, and has sent to the head teachers lists of valuable English and Gaelic books from which a selection may be made. In this way a large number of rural schools have been supplied with the best literature. This will help to foster in the pupils a love for good books, and at the same time relieve School Boards and ratepayers in parishes where the rates are high and the provision of such libraries a real concern.

R. D.

AN ECHO FROM THE HYGIENE CONGRESS.

"EDUCATION suppresses the left hand. The child is sent out into life only half educated—one brain lobe practically untouched, and one hand awkward, clumsy, and incompetent. This affords an irresistible argument in favour of ambidextral culture.

"The arguments of the Ambidextral Culture Society are that both hands can be trained to practically the same degree of efficiency; there is no advantage in having one hand inferior; there are countless instances where the possession of only one skilful hand is embarrassing; and, finally, two-handed writing and culture gives results superior to anything attainable by one-handed education."

YOUTHS AND MAIDENS IN ART.

BY HAROLD ARMITAGE,
Author of "A Life of Greuze," etc.

IV.

QUITTING Spain for France, and leaving the seventeenth century for the eighteenth, we come to one of the most romantic and seductive periods in the history of the world's art. During the time that Velazquez and Murillo were painting in Spain there was no spontaneous nor native art in France. Such painters as worked in that country during this period had no ideas of their own, and they could find nothing better to do than repeat the notions of the Greeks and Romans with tiresome iteration. It was an age of ceremony, of court etiquette, and of absurd conventions; and the artists of Paris, if they painted Louis the Fourteenth, must needs paint him as Cyrus or as Alexander, so far had they travelled from any love for what is fresh and natural. But dark as was this era, it was dark with the gloom that preceded a glorious dawn. The eighteenth century was a time of splendour in French art. Pictures of quite a new and wonderful kind were painted, poetry superseded prose, and brilliant genius replaced dull mediocrity.

Foremost amongst the artists in the new era stands Watteau, the master of witchery and of charm, and the magic circle includes Boucher, Pater, St. Aubin, and Chardin; but the artist of this period whose name has become inseparably associated with the painting of youths and maidens is Jean Baptiste Greuze, a native of Tournus, near Mâcon, in Burgundy.

His genius is not so rare as the genius of Watteau, and it is easy to find fault with many of his works; but at his best Greuze reached a high level of achievement, and, as the windows of the print-shops testify to-day, his popularity is great, and is increasing.

Why he became a painter of children is not clear. Though he grew at last to be something much greater, his ambition at first was to be a painter of historical pictures, and he spent some years in this quest; but he failed, and a particularly bad example of historical painting brought upon him the humiliation of rejection as a historical painter by the members of the Royal Academy of France. Then, too, before he found his own sphere he went to Italy, and considered it necessary to paint Italian works—or, at any rate, pictures with Italian names.

His first success with the people of Paris came, after some years of struggle and neglect, with his "Un Père de Famille qui lit la Bible à ses Enfants," and this success was confirmed by his "Un Mariage à l'Instant où le Père de l'accordée delivre la Dot à son Gendre." But he is remembered now chiefly for his heads of girls and boys. And, indeed, had he not painted these, it is doubtful whether his other works would have placed him in the position he now occupies; for even to-day he receives less than his due share of praise for his excellent work as a portrait painter. Many of his works are merely anecdotal, or they contain moralisings; but in these charming heads of girls the artist emerges from the story-teller and the moralist, and gives us his feeling for beauty untroubled by any reference to less pleasing matters or to impenetrable enigmas. Examples of these seductive studies are to be found now as the treasures of costly collections many miles

A Girl with an Apple.
(*Painting by Greuze.*)

from the place in which they were painted. England, Scotland, Germany, Russia, and the United States have all been eager and proud to secure Greuze's works for their public and private treasure houses; and not many pictures have been painted in any country, or at any period, that are so pleasing. An intense love for beauty and a power to portray it, the skill to make the spectator respond to the emotion which the artist felt, are apparent in most of these pictures. The models themselves must have been girls of exceptional beauty, and Greuze's technical skill and manner were equal to the task of bodying forth their loveliness for the admiration of future generations.

Most people who visit the picture galleries in which examples of Greuze's paintings hang will fall at once under the spell of the bewitching eyes of these handsome children, each "like a blossom vermeil-white," with their beautiful brown hair—in which the piece of blue ribbon nestles with such perfect harmony of colour—drooping gracefully over white neck and rosy cheek.

In London, in the Wallace Collection, and at the National Gallery it is possible to see how supreme Greuze was in the painting of children; and it is possible also to discover what the faults were which beset his work, for not even the most enthusiastic admirer of the artist can deny some glaring imperfections among his pictures. Fortunately, however, these imperfections are confined generally to his bad pictures—to works like "Fidelity," "Ariadne," and "A Bacchante" in the Wallace Gallery—so that we are free to admire, without reservations, such pictures as "The Listening Girl" (so called) and "Innocence" in the same collection. In his inferior works we have exaggeration, affectation, posturing, sentimentality, artificiality, and heads of girls upon the shoulders and bodies of women; but when all that can be said in dispraise of Greuze's works has been said, there remain a sufficient number of works quite free from these blemishes to justify the critics in placing Greuze high amongst the artists of the world.

One of Greuze's paintings that has none of the shortcomings that have been indicated is one of those we have reproduced—"A Girl with an Apple." The original is amongst the treasures of the National Gallery, and the picture consists of a girl with light hair, and dressed in blue and white, resting on a red cushion, and holding an apple in her left hand. There are no hints of affectation here, neither in the subject nor in Greuze's painting, which is indeed a piece of straightforward work, simple and excellent in every way. There is another characteristic work by Greuze in the National Gallery—"A Girl's Head draped with a Scarf." In this country it is one of his best-known pictures. More than thirty years ago it was reproduced in popular magazines, and many a time since by each process in turn. There is some degree of mannerism in the way that the hands are held, and in the way that the shoulder has been obtruded. Greuze, too, has anticipated, though in a small measure, in the slightly-opened mouth of this girl, that stereotyped smile which—thanks to the dentist—greets us now from a thousand picture postcards of latter-day actresses. But the general effect of the picture is one to charm and to please, and the work well deserves its popularity.

Greuze's career was interesting and romantic. He was born in 1725, the son of obscure people, his father a provincial builder and slater. Showing irresistible tendencies towards art, he was sent to Lyons to learn painting from Grandon, a portrait painter. Dissatisfied with his lot there, he went to Paris, where, after a period of penury, he emerged at length into an abounding popularity. In time it became fashionable to visit his studio, and the Emperor Joseph the Second, royal

Head of a Young Girl.
(*Painting by Greuze.*)

princes, the nobility, and foreign dignitaries went to see Greuze at work; and the painter amassed a large fortune. But his prosperity was fleeting. A hopelessly immoral and extravagant wife squandered his money, and the Revolution broke out and completed the ruin. Greuze was forgotten, his pictures went out of fashion, and once more native art became moribund in France, recovering not until 1830. Meanwhile Greuze died in poverty in the year 1805. A number of love romances light up his life; and even his wife, wicked as she became, was young and beautiful when Greuze saw her first in a Parisian book-shop, where he and Diderot went to buy books that they might enjoy her sprightly conversation and pretty ways.

Belonging to the same period, though she lived on until 1842, is another notable painter of children—

MADAME LE BRUN AND HER DAUGHTER.
(*Painting by Madame le Brun.*)

Madame Elizabeth Louise Vigée le Brun—who was born in Paris in 1755. Her famous portrait of herself and her daughter is in the Louvre. Reproductions abound on every hand, and yet its charm never palls. Her father, whose name was Vigel, painted portraits; but he died when his daughter was twelve years of age, and she received lessons from another artist named Briard, and some assistance from Greuze, whose works she copied, and from Joseph Vernet and Doyen. Naturally clever, her progress was so rapid that she was able to paint portraits when she was fifteen years of age; and marrying a prosperous picture-dealer, Le Brun, grand-nephew of the painter Charles le Brun, she lived in a world of excellent paintings, and studied with such assiduity that she was admitted a member of the Royal Academy, notwithstanding the great opposition that was brought to bear against the proposal of a woman member. The king and queen, too, were attracted by her work, and amongst her many charming paintings are a number of portraits of Marie Antoinette and her children. Some of these may be seen still in the palace of Versailles. Madame le Brun's relation with the queen was more than that of a court painter, for Marie Antoinette treated her as a friend.

When the great Revolution began the artist fled to Italy; but she never fled from popularity, for in Rome, Naples, Milan, and Venice, as afterwards in Vienna, Prague, Dresden, St. Petersburg, London, and the towns of Holland and Switzerland, she was received with acclamation and loaded with honours. All the time her industry never flagged, and she painted 662 portraits, 200 landscapes, and 15 other pictures. While she was in London she painted portraits of the Prince of Wales, Lord Byron, and other prominent people.

Much concerning Madame le Brun may be learned from the charming picture we have reproduced—a work of permanent value. She was strikingly handsome; and if this had not been so, she had the most delightful manners. One feels also that her attitude to her daughter is not merely a pose, nor is the daughter's affection for the mother put on for the occasion. Grace, charm, and a mother's love are all perfectly rendered, and the picture stands out as one of the most beautiful paintings in the world. There is another delightful portrait of Madame le Brun at Florence in the Uffizi Gallery; and the one we have reproduced is in the Louvre, with many other examples of this artist's work. She was the last of the pleasing French painters of the eighteenth century. Paris had an attack of a fantastic Roman fever now, and the delirium did not subside until 1830, when the beauties of nature were found by Millet and others in the forest of Fontainebleau; and artistic France regained its sanity and returned once more to occupy a foremost place in the world of art.

(*To be continued.*)

THE PAGEANT AT ST. ALBANS.

A STRONG impression that remains upon the mind upon a comparison of the "Great" Pageants (as Mr. William Archer has happily named them) at Oxford, Bury, and St. Albans is the character of the town itself, not only as seen in the light of ancient history, but as interpreted by present-day performers, who lent an interesting individuality to the show, which was due to local varieties of habit or social class.

Thus, the horsemanship of St. Albans, the centre of a hunting district, gave its pageant a *cachet* that distinguished it from the others. From the first episode to the last the actors remained mounted, instead of riding up to the arena and then dismounting, as was almost the invariable rule in the other places. This added greatly to the picturesqueness of the scene, and gave, moreover, a pleasing touch of realism, and sometimes, as the steeds plunged about, a thrill of apprehension, which were outside the intention of the librettist. Caractacus and Julius Cæsar exchanged compliments and defiance, the one seated on a barebacked steed, with flowing mane, himself shaggy and hairy, and clad in skins, while the noble Romans formed in their *acies* or *exercitus* in the approved Cæsarean style.

Then came Boadicea, an excellent actress, who might have been easily taken for a professional, with her

splendid declamatory style and finished "death scene." The Romans fled from the temple of Diana at her approach, led by a chorus of singing maidens, of whom one had a lovely and pathetic voice that was capable of filling a large concert hall, but which, we understood, had hitherto only been heard in drawing-rooms. St. Alban, the patronymous hero of the place, next appeared, a saint and martyr who leaves us cold by comparison with St. Edmund, whose arrow-strewn form, as it is seen in the glorious churches of Norfolk and Suffolk, has such a familiar air. After all, St. Alban was a Roman, and it was fitting that he should give his name to a Roman town; but his memory is not enshrined in English hearts. His interview with his executioners and the Roman governor was wordy but not altogether effective.

Next came Offa, king of Mercia, the founder of the abbey, a king, again, whose kingdom evokes no such traditional sentiment as those of Wessex, East Anglia, or even Kent. He discovered the bones of the saint, and confessed himself guilty of the murder of Ethelbert, king of the East Angles, for which he had now atoned by a pilgrimage and the founding of the new abbey.

The monks of St. Albans were far inferior in spirit to Abbot Sampson and his brethren—at least, as portrayed by their exponents in the pageant. Henry the Third's acquaintance with them, and particularly with that beloved brother, Matthew Paris, might have furnished an amusing episode; but presumably his name was "crowded out" by other celebrities. The funeral procession of Eleanor of Castile, one of the finest effects of the whole spectacle, could, however, little have been spared. The hearse, a huge scarlet wagon, with lighted torches stuck in its four corners, and drawn by horses draped in black, was preceded by mourning lords and ladies, and followed by a noble-looking knight in full armour, with black trappings, the sorrowful king, Edward the First. To these entered a procession of richly-gowned ecclesiastics, and swung their censers around the hearse. It was a feast of bold effects of colour, whose solemnity was enhanced by a finely-played funeral march.

The Peasants' Revolt, led by John Ball on his mule, was dull by comparison, until the boy king, Richard, a true Prince Charming, appeared with his gaily-dressed train, himself and his pages in green costumes touched with white. He condemned the rebel leaders to be hanged, and turned with careless indifference to his courtiers for amusement; while another hapless king, Henry the Sixth, was led upon the scene, the sport of the rival factions of York and Lancaster. This gave an opportunity for the *chef-d'œuvre* of the pageant, a realistic "second battle of St. Albans," in which the archers discharged a most workmanlike shower of arrows, and horsemen dashed wildly about, pursued or pursuing, very like, it is to be supposed, a real battle. Warwick the king-maker was prominent in armour of the period, brandishing a furious sword; while other nobles held long lances, and the footmen handled their pikes and bills as though to the manner born. It was amusing, but one could not but think "*Ce n'est pas la guerre.*" However, it does not do to be hypercritical. Battle scenes on any stage, or indeed in any form of art, should not be too realistic, lest they should become unbearably painful. Nevertheless, a skilful circus manager can do this sort of trick as well as or better than amateurs. The pageant concluded with appropriate revelling, the meeting of Queen Elizabeth and the Bacon family, and some excellent morrice dancing. Individual performers in this pageant were conspicuously admirable. Something in the air of the neighbourhood seems to produce fine and resonant voices. Nevertheless, it did not impress me altogether as a whole and complete drama of the city. It may be that spectacular incidents are not abounding in the history of the town. Or possibly the skill of the librettist, an assistant master at the grammar school, a competent scholar and enthusiastic antiquary, needed some supplementing by a writer more habituated to dramatic effects. The connection of school and stage which Mr. Ashwell's co-operation indicated is, however, a healthy sign of the times. His episodes only needed a little more welding into shape and dovetailing together to make us feel the character of his protagonist, the town of St. Albans.

The actual walls of Verulam were a prominent feature on the stage, which was skilfully selected so as to show a distant view of the magnificent and still existing Abbey Church. The study of topography, or the association of persons with places, or places with persons, fascinating as it is, does not appear, however, to be of the *essence* of a pageant. The connection of St. Alban or of Francis Bacon with Verulam is, as it were, an accident, not conditioned, as philosophers say, by any inherent necessity, just as the name of Sir Thomas More, though particularly recalled at Chelsea, is a household word in all parts of the Empire. The stimulation of local patriotism by pride in the local hero is, in fact, merely a *first aid* to the historic sense. History itself is independent of place or time.

Teachers, even in these well-organised times, find it difficult to secure that each pupil should survey at least once in the whole course of school life a long period of history or literature, say from William the First to George the Third, in such wise as to gain an idea of the proportion of any given epoch to the rest of what constitutes the unity of English history as distinguished from world history. Skeleton outlines are dismal, and can only be understood by the already well-instructed. On the other hand, full details—for example, of the courtships of Queen Elizabeth—are to be deprecated, since they must needs involve a loss of proportion. Even now, I imagine, not a few grown persons have youthful recollections of history less than sketchy in the region of Henry the First, while their notions concerning Charles the First and Cromwell are frequent and full. Such a general survey is given in the most agreeable manner by these spectacles of continuous historical procession. The scroll of time is, as it were, unrolled before one's eyes, and its inky blots and scarlet illuminations stand out clear in memory. The roll of kings and queens—at Oxford: Harold Harefoot, Henry the Second, Henry the Eighth, Elizabeth, James the First, Charles the First, James the Second, George the Third; at Bury: Boadicea, Edmund, Henry the First, Richard the First, John, Henry the Sixth, Mary Tudor, Elizabeth; and then again at St. Albans: Caractacus, Boadicea, Offa, Edward the First, Richard the Second, Henry the Sixth, Elizabeth—fit themselves once for all like the pieces in a puzzle to the brain-map of which we each are dimly cognisant. Or, if we are old enough to conceive of history as a series of "movements," not altogether depending for their interest or origin upon kings and queens, we can trace at Oxford the progress of human thought, from the legend of St. Frideswide in the Dark Ages, through the beginning of learning under Theobaldus Stampensis, "reasoner and churchman"

(1110 ?), and the beginning of natural science in Friar Bacon, to the days of mediæval learning, when there were but three sciences (divinity, medicine, and law) and seven arts (grammar, rhetoric, logic, arithmetic, music, geometry, and astronomy) in the fortunate student's curriculum.

In the two abbey towns historical incidents of a salient kind ended, it will be observed, with Queen Elizabeth. Each of these indeed possesses a roll of more or less distinguished names belonging to a later period. The minor makers of history—so to call them—crop up in all sorts of unexpected quarters. And we may yet perhaps see the beginning of a new movement emanate from one of these smaller historic towns. But—and this is, as I hinted in my last article, the point where pageantry breaks down—such great names as Newton, Bacon, even Shakespeare, do not readily lend themselves to spectacle. Little is really gained, either for the show or for the historic imagination, by dressing up a young boy as an Elizabethan youth and labelling him Francis Bacon or Shakespeare, as the case may be, to enact a part in the crowd that greets the queen. The true significance of such a meeting is only perceived by persons whose imagination or whose culture requires no aid from pageantry. To the uninstructed the queen, under such circumstances, inevitably appears greater than the future sage or poet. A clever interlude, indeed, of Shakespeare and James the First (a pleasing reminder, by the way, that part of the poet's life did extend beyond the spacious time of Elizabeth's old maidenhood) was *written* by Miss Wordsworth; but, alas, not completely enacted at Oxford. It was full of critical suggestion and irony, but for that very reason not suited for the particular occasion, when "much speaking" is to be so far as possible avoided. It was fine to think, however, of the witches in *Macbeth*, with their boiling cauldron, having actually appeared for the first time before the later Scottish king. They were set upon a scaffold-like platform, after the manner of the earlier pageants, while the gracious sovereign made audible criticism. High-school girls who were present would be furnished henceforth with an admirable *mem. tech.* that *Macbeth* belongs to Shakespeare's "later period."

The gem of the whole performance at Oxford was the masque, or play within the play, of the mediæval curriculum. Here beautifully-clad allegorical figures, whose gestures showed what they were, moved in graceful rhythmic wise across the lawn. The Wise Student selected the sober Dame Divinity to be his mistress, while the Vain Student turned impatiently from the Arts, who barred his way to the Three Queens of Science, and followed with greedy delight the rout of Folly and Pleasure, with their train of Pride-of-Life, Gaming, Venery (hunting), Gluttony, and the rest, all gotten up in the style of old frescoes and sculpture as they are seen in mediæval churches. These twined the Vain Student around with garlands, and dragged him out singing and dancing, "and then one may perceive Time following after them full silently"—a solitary figure of an old bearded man with a scythe and an hour-glass. Such allegory, appealing directly to the eye, was plain for any child to understand. And it is of such stuff that pageants should be made.

The pageants of this year have indeed, so far, been an unmixed good; but let us be wary against over-production. It is much to be hoped that fools will not rush in and make notoriety for themselves where self-knowledge, self-reverence, self-control are so much required. A pageant ought to be a great work of art and labour of love. The way of degeneration is painfully apparent. But the temptation to exceed may, it is to be hoped, be averted—if not by any worthier motive, at any rate through fear of financial failure

The abiding result of these great folk-plays is assuredly to quicken the sense of the immense mass of historic material that lies everywhere at our feet. The precious metal of historical incident seems inexhaustible. But it is not given to every one, nor in every place, to be able to make of it an artistic whole.

THE EXPLORATION OF AUSTRALIA.

BY J. F. UNSTEAD, M.A., F.R.G.S., LECTURER IN GEOGRAPHY, GOLDSMITHS' COLLEGE, UNIVERSITY OF LONDON.

(*Continued from page 122.*)

THE Murray is turned southward by the South Australian Highlands; and beyond these lies Adelaide, the capital of the colony of South Australia, founded in 1836. The rest of the country beyond the South Australian Highlands was quite unknown, and was the next part of the continent to be explored. Mr. Eyre went northward from Spencer Gulf up a depression partly filled with water, and found Lake Torrens, which appeared to be a great swamp of salt. Saltness is a characteristic of these lakes of inland drainage, and many a traveller was disappointed in coming upon them not to obtain water fit for drinking. When Eyre discovered Lake Torrens, he found "the dry bed of a lake coated over with a crust of salt, forming one unbroken sheet of pure white, and glittering brilliantly in the sun. On stepping upon this, I found that it yielded to the foot, and that below the surface the bed of the lake consisted of a soft mud, and the farther we advanced to the westward the more boggy it got, so that at last it became impossible to proceed, and I was obliged to return to the outer margin of the lake without ascertaining whether there was water on the surface of its bed farther west or not."

So Eyre had to retrace his steps for lack of fresh water, and then attempted another journey. He went westward by the shores of the Great Australian Bight; but before he had gone a quarter of the distance to the habitable land in the south-west of the continent his troubles began. Some of his horses which carried provisions died; he was forced to send back some of his party; and with one white companion and a few native servants he pressed on across the desert. More horses died; his companions lost heart; and at last two of the natives shot his friend, and deserted. Eyre describes his terrible plight in these words: "At the dead of night, in the wildest and most inhospitable waste of Australia, with the fierce wind raging in unison with the scene of violence before me, I was left with a single native, whose fidelity I could not rely upon, and who, for aught I knew, might be in league with the other two, who perhaps were even now lurking about to take my life as they had done that of the overseer. Three days had passed away since we left the last water, and it was very doubtful when we might find any more. Six hundred miles of country had to be traversed before I could hope to obtain the slightest

aid or assistance of any kind." The guns and most of the food and water had been taken; but the remaining native proved loyal, and the two struggled along until, just when death seemed at hand, they saw a whaler off the shore. They went on board for a time, regained some strength, and then bravely set off again. After nearly another month of privation and exhausting toil, Eyre reached the post at King George's Sound, where now is the town of Albany, and turned inland in the direction of Perth. Here in this southern corner of Western Australia the rainfall is fairly abundant, and the natural resources, both agricultural and mineral, have led to the growth of a very considerable population; but to this day there is no railway connecting Western Australia with the rest of the continent.

Four years later Sturt made a brave attempt to leave the rivers and the coast, and get to the heart of the country. He set out from the Darling River where it is nearest the centre of Australia, and travelled north-westward through a country almost without water. It was sometimes bare and rocky, sometimes with great parallel dunes of sand, and sometimes covered with a terrible grass called spinifex, so dense and prickly that it was almost impassable. At last he was forced to return when he had reached a point midway between Spencer Gulf and the Gulf of Carpentaria. Of the heat in this part Sturt wrote: "The mean of the thermometer for the months of December, January, and February had been 101°, 104°, and 100° respectively in the shade. Under its effect every screw in our boxes had been drawn, and the horn handles of our instruments, as well as our combs, were split into fine laminæ; the lead dropped out of our pencils; our signal rockets were entirely spoiled; our hair, as well as the wool on the sheep, ceased to grow; and our nails became as brittle as glass." To a friend he afterwards said that the sands were so hot that if a lucifer match were let fall on them it instantly took fire.

About the same time (1844) Queensland was crossed by Dr. Leichhardt. He started from Brisbane, and travelled northward in rear of the coastal ranges until near the eastern shore of the Gulf of Carpentaria. Then he went round the gulf, and reached the sea at Port Essington. This journey was completed in a comparatively short time; for although the travellers experienced hardships, and one of them was speared by natives, yet they were not in a waterless region. A rainfall map shows that this part of the continent has an annual rainfall equal to that of the west of England, and much of the country traversed was very fertile. Encouraged by the success of this journey, Dr. Leichhardt attempted the more difficult one of crossing the continent from Brisbane westward. A letter was written by him at a station about half-way across Queensland, but that was the last ever heard of him or any of his party. It is thought that they must have died of thirst in the terribly hot and dry interior, and that the fires that sometimes occur among the spinifex and other forms of desert vegetation must have destroyed their remains, for, although since then others have explored that part, no traces whatever of the expedition have been found.

Cape York Peninsula was explored a little later by Kennedy, and in this case the difficulties were of an entirely different character from those of most of the previous travellers. The north of Australia lies well within the Tropics, and has such a climate that even now it is not a white man's land, and the work is done by Kanakas from the islands of the Pacific. There is an abundant rainfall, especially in the summer, and as a consequence there is dense and luxuriant vegetation of the jungle type. In the lowlands near the coast Kennedy found great swamps, which were a very unwelcome indication of the abundance of rain, for these and the jungles forced him to leave the carts which carried his stores. Then the vegetation was of a horrible character. There was a tree whose leaves very severely stung those who touched it, and the growth was so thick that to avoid it was impossible. Again, there were trailing plants which had sharp points and hooks which caught men and animals, and made the passage very slow, exhausting, and painful. Accidents and illness added to their bad fortune, and Kennedy thought it best to leave the rest of the party with most of the provisions, and go forward himself with one native to get help from a ship which was to meet them near Cape York. Then came the climax of the tragedy. The natives became hostile, followed the two, and at last attacked them and speared Kennedy. His native servant escaped and reached the ship, which sailed back and sent relief to those left behind. These also had had to defend themselves; some had died, and only two of the whole party were left alive when the relievers forced their way to them and rescued them.

A journey which stands out even among these exploits for perseverance and also for the valuable results which followed its successful completion, was that made by Stuart from Adelaide northward across the heart of the continent to near Port Darwin. He made the first attempt in 1860, and marched to the centre of the country, leaving Lake Eyre on his right. He was fortunate in finding ranges of mountains along his course, for these had some streams of water which dried up as they reached the lower grounds of the interior. When two-thirds of the whole distance across he encountered natives who were very threatening, and barred his further progress. He returned, but next year started with a larger party, and avoided that particular district: thus he overcame that difficulty, and reached a point considerably to the north-west. But here the dense scrub proved impassable, both food and water were lacking, and he was forced again to go back. A third time he set out, and kept to his old route for the first part of his journey, but when the critical parts were reached he marched further to the west, and this time managed to get right through to the sea; moreover, he returned quite safely by the same route.

This success was the virtual conquest of the central part of Australia, for it showed a way across the continent that has been utilised in two important ways. In the first place, the Overland Telegraph Line, seventeen hundred miles long, was laid along this route from Adelaide to Port Darwin, and thence a submarine line connects it to Singapore and Europe. This great work was only accomplished after two years of toil. The workers were hindered in some places by the difficulty of getting food and water; in others by the torrents which followed heavy rains; elsewhere the natives were hostile; and finally, when these difficulties had been overcome, they found that the white ants ate the wooden telegraph poles, and new poles of iron had to be substituted. Great help was obtained by the use of camels, and one hundred

of these were employed in the arid parts. Besides being able to bear great heat and to travel a long time without water, they can feed on the scanty and poor bushes which are useless to horses. When the line was set up, permanent stations were made at intervals to ensure its proper working, and so a chain of small settlements now extends across the interior.

Besides giving the advantages of communication, this work very greatly aided the further exploration of the vast regions on either side, for the telegraph line with its stations afforded a base from which journeys might be the more easily undertaken. Quite a number of explorers have started from various points and crossed the intervening space of about one thousand miles between these and the settlements of Western Australia. Among these the first to cross the desert was Colonel Warburton, who had the great advantage of a number of camels. Were it not for this help the journey would probably have ended in disaster, for Colonel Warburton, too weak to walk, or even to sit up, had to lie strapped on his camel's back.

Another explorer whose work is well worthy of mention was Mr. Giles. It was he who discovered Lake Amadeus, and he afterwards travelled completely across the country some distance south of the Tropic of Capricorn, and also about in latitude 30° S. On these crossings, which, moreover, were preceded by futile attempts, he suffered hardships which make one wonder at his perseverance in repeatedly returning to such labours. In his remarkably interesting book, *Australia Twice Traversed*, he writes thus: "Everybody had an attack of the blight, as ophthalmia is called in Australia, which with the flies was enough to set any one deranged. Every little sore or wound on the hands or face was covered by them in swarms; they scorned to use their wings; they preferred walking to flying; one might kill them in millions, yet other and hungrier millions would still come on, rejoicing in the death of their predecessors, as they now had not only men's eyes and wounds to eat, but could fatten on the bodies of their slaughtered friends also. Strange to say, we were not troubled here with ants: had we been, we should only have required a few spears stuck into us to complete our happiness."

There have been many others, even the mention of whose names space will not permit, who have added to men's knowledge of the continent, and so led to their mastery of its great resources. They have shown the way, and others are now entering into the fruit of their labours. Where with the greatest difficulty the earliest travellers crossed the mountains of the east, railways now run; and the lands that they risked their lives to find are a permanent inheritance of the people of later times. The greater part of the exploration is now completed, but the utilisation of the lands and their resources has probably only just begun. Where in the north the explorers found dense jungles, sugar plantations promise wealth to the colony, and the tropical climate will doubtless in time give an enormous amount of vegetable productions for the use of man. So in the west, where Warburton, Forrest, Gregory, and Giles led the way, others followed, and gold was discovered.

Looking forward, one can foresee a great future before Australia, and it is well to remember those who by their struggles laid the foundations of the fortunes of the Commonwealth, and so added immensely to the greatness of the British Empire.

"WHAT MEAN THESE STONES?"

BY EDMUND A. GREENING-LAMBORN,
Headmaster S. Mary Magdalene Schools, Oxford.

(*Continued from p. 144.*)

BYGONE DAYS IN THE VILLAGE CHURCH.

THE font usually stands near the door, symbolising the fact that by baptism the child enters the Church, and its stone work corresponds with the carving of one of the architectural styles. The early fonts are large, in order to immerse the child fully; but judging by the size of Perpendicular fonts, the practice must by that time have been abrogated in favour of the present method. Some Norman fonts, as at Dorchester, are of lead, covered with arcades of round arches. Early English fonts are generally of plain stone, very large, with massive plinths or bases. Sometimes, as at St. Giles, Oxford, fonts of this period are enriched with the dog-tooth ornament. Decorated fonts are often cup-shaped, ornamented with panels reproducing the

FIG. 49.—EARLY ENGLISH CHANCEL, BUCKNELL, SHOWING LOW SIDE WINDOW.

tracery of the windows; and in Perpendicular fonts the panelling also partakes of the squareness which is the distinguishing feature of the style. In some churches, as at Ewelme, Oxon, the font has a high-carved cover, ornamented with pinnacles, crockets, and niches containing carved figures. These lids were originally made to be locked. Sometimes a niche in a wall or pillar near the font shows where the holy oil used at baptisms was kept. On the lintels of the doors and in other places in the church were painted or cut twelve crosses at spots which the bishop anointed with holy oil at the consecration of the church. One of these may be seen cut in the jamb of an early Norman doorway of the little church of Berrick, near Wallingford. Standing in the nave, facing the chancel arch, one will see in some churches that the chancel is not in line with the nave, but is inclined to it at a slight angle. This is supposed by some to symbolise the drop of the Saviour's head on the cross, because it makes the plan of the church a crucifix rather than a cross.

Frequently under the east windows of the aisles,

and sometimes in other situations in the church, there may be found evidence of the former presence of altars. These consist of small drains in the walls on the south

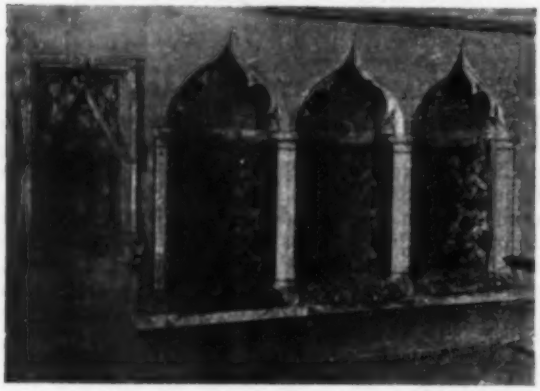


Fig. 50.—Decorated Piscina and Sedilia, Fyfield, Berks.

sides of the windows, called Piscinæ. The purpose of a piscina was to carry off the water used in the washing of the sacred vessels after the celebration of the Holy Communion. Near the piscina are usually brackets or recesses, which supported the images placed above the altar.* In Kidlington Church, Oxon, are half a dozen piscinæ, indicating the presence of as many altars. A dying person often bequeathed a sum of money to be spent in the saying of masses for his soul's salvation, and these masses were celebrated on the flat top of his tomb, which thus became an altar. Examples of these altar-tombs with piscinæ near them are fairly common. The mouldings and decorations of a piscina are of the same character as those of the doors, windows, etc., of its date, and from the description of the various styles previously given the date of any piscina can be easily recognised. Usually they are of the same date as the aisle in which they are placed, and perhaps mark the tomb of the founder.

In the sanctuary of the chancel there is often on the south side, besides a piscina, a series of three stone seats, called Sedilia, which were used by the priests and his assistants at the mass. The ornaments of the sedilia correspond with those of the other carvings of its date. Sedilia of the Decorated period often have canopies above them, ornamented with crockets, finials, and ball-flower, as at Dorchester, Oxon. In the walls of the sanctuary, too, on one or both sides of the altar, are recesses like cupboards, which formerly had doors, of which the hinges sometimes remain. At Begbroke, near Woodstock, a cupboard with door and lock complete may be seen. These recesses are called lockers, almeries, or (incorrectly) aumbries, and were intended to contain the sacred vessels when they were not in use.

In the chancel, too, the westernmost window on the south side must be noticed. It will often be seen that this window is either a small one placed lower than the others, or, if it corresponds to the others, has a transom at the level of the others' sills, and is continued below it nearly to the ground. Sometimes, as at Garsington, Oxon, such windows may be seen on both sides of the chancel; and they may occasionally be found in the walls of the nave or aisles, as at Cuddesdon, Oxon, in which case there is usually a piscina close by, indicating that the window opened on to a side altar. Sometimes, as at Cowley, Oxford, an inspection of these "lowside windows," as they are called, reveals on the inner right-hand side some iron hinges, showing that the window was originally fitted with a shutter, and not with glass. In some of these windows, too, as at Elsfield, Oxon, it will be seen that the sill has been carved into the form of a book-rest. These facts seem to point to what until recently was the commonly-accepted explanation of the presence of lowside windows—namely, that they were used for the administration of the Sacrament to lepers and others who could not be admitted into the church, and that through them such unfortunate people might obtain a view of the altar and of the Elevation of the Host. Such windows are almost all of the Early English and Decorated periods—that is, they were constructed at the time when the constant intercourse of England with the East during the Crusades must have brought leprosy, and, later, the bubonic plague, into this country. This fact also seems to point to their being used for service with the priest inside the church and infected persons without. It has been suggested by Mr. H. J. Hodgson (Archæologia Æliana) that a light was placed in these windows to frighten evil spirits, but I have never found any sign of a sconce or lantern-rest in one; and the fact that the window had shutters, which if shut would have hidden the light, and if open would have exposed it to wind and rain, seems to negative the theory. Another explanation suggested is that they were used for confession.

In the walls both of the nave and chancel, but especially in the latter, there are often shallow recesses

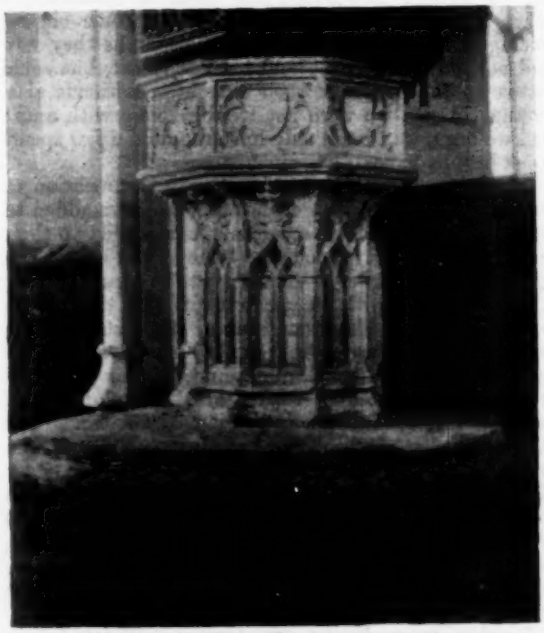


Fig. 51.—Panelled Perpendicular Font, c. 1450, Ewelme.

about six feet long, on the ground, with low, ornamented arches above. In these recesses at the level of the ground may sometimes be seen the lid of a stone

* In almost every case these images were removed from the niches by the Puritans, leaving unsightly blanks in the recesses. It will be remembered that one of the charges against Laud was that he had caused an image of the Virgin to be placed in a niche in S. Mary's, Oxford.

coffin, carved usually with a long cross along its whole length. Below the lid reposed—perhaps still reposes—a former lord of the manor and benefactor of the church. But one of these chancel tomb-recesses, on the north side, had another use. On Good Friday evening the large crucifix was taken down from the altar (symbolising the Descent from the Cross), and solemnly carried in procession round the church. It was then laid in the tomb-recess, together with a figure of the Crucified One and the Host. Here they remained until the dawn of Easter morning, when they were brought forth again with festive ceremonial. A tomb-recess used for this purpose was called an Easter Sepulchre. In some churches special recesses, other than tombs, were constructed; and if a church had no recess available, a temporary wooden "sepulchre" was made.

On the inner side of the Rood screen, "returned" against it, facing the altar and along both walls, were the priests' stalls; and where the mediæval woodwork remains, its carving will always repay careful inspection. The carved pew-ends are called "poppy-heads" (from Fr. *poupée*, "a doll"), as they often represent grotesque figures. Behind one of these seats at Milton, Oxford, is a large earthen pitcher, imbedded in the wall, lying on its side, mouth outward. It was probably placed there, perhaps with others, to improve the quality of the singing and increase the volume of the sound. Such pitchers were often buried in the ground under the "return stalls" for that purpose. In some churches, as Berrick, Berks, specimens of mediæval tiles remain for our inspection. In making these tiles the pattern was cut and hollowed in the red clay, and the hollows were filled up with liquid white or yellow clay, after which the tile was baked, the pattern thus being ineffaceable.

The pulpit will often repay examination. Few earlier pulpits remain than those of the seventeenth century, but there are some stone ones of the Perpendicular period, as at Combe, Oxon, with the characteristic panelling. Jacobean pulpits are fairly common, and they show round arches and other classic features, which announce the coming supremacy of the Renaissance style. The Puritan love of long "discourses" is evidenced by the hour-glass stand which is often fixed to the wall or pillar near the pulpit, and occasionally, as at Beckley, Oxon, by the hour-glass itself yet remaining in its stand. In some churches, as at Hampton Poyle, Oxon, may be seen small recesses in the walls, somewhat resembling piscinæ, but without drains. These may be heart coffins, in which the heart of a knight who fell in a foreign land was buried, having been cut out and brought home for the purpose.

HOURS OF SLEEP AMONG SCHOOL CHILDREN.

RECENT discussions have led Miss Alice Ravenhill to inquire into the hours of sleep among children. This was done by sending out 10,000 forms of questions, of which 8,650 were returned and analysed by her.

Analyses of the returns tabulated show—(1.) The percentage of sleep grows less (from 50 per cent. to 30 per cent.) in both sexes from four to seventeen years of age. (2.) Girls have more sleep than boys, but neither have sufficient. (3.) The variation is greater among girls; both sexes have more in winter. Sleep is affected by housing conditions and by home employment. The range of occupations for children is almost incredible. Finally, deficiency of sleep is a potent factor in malnutrition.

THE TEACHING OF ARITHMETIC: PAST, PRESENT, AND FUTURE.

BY A. CLEMENT JONES, M.A., PH.D., AND
C. H. BLOMFIELD, M.A., B.SC., BRADFORD GRAMMAR SCHOOL.

(*Continued from page 125.*)

THE advantages of this oral work are numerous; we have probably made it clear that by oral work we do not mean merely mental arithmetic in the narrow sense. All new methods, new ideas, new phrases, are taught in the oral lesson, and no written work is done in any part of elementary arithmetic until the principles involved are thoroughly understood by the pupils. The blackboard is most useful to the oral teacher; if results, or parts of results, are recorded on the blackboard so as to assist the pupils, a much more varied type of question can be asked. Among the many advantages of the oral method we may note:—

1. A larger number of mistakes can be corrected at the times at which they are made.

2. Difficulties which the pupils have can be followed up and threshed out.

3. Defects in the pupils' conception of particular points can be readily discovered—for example, a word which has no meaning to the pupil, or even a wrong one.

4. Mental work is encouraged, individual thought and the power to think out the process before beginning a question are stimulated.

5. The weak boys can be assisted by supplementary questions.

6. Pupils can be made to check their results by common-sense considerations.

On the other hand, some difficulties arise and must be carefully met.

1. When printed oral questions are used, there is a tendency for pupils to count ahead and to prepare the answer to the question they expect to have beforehand. This means that the class is not attending as a whole to the matter in hand, and also that an individual boy only works out one question instead of all. This difficulty can be overcome either by the master only having the questions, in which case many boys will be unable to carry any question of more than one simple step in their heads; or the questions might be printed without the actual figures being inserted—for example, How many — -penny cakes can you buy for —*s.*? We believe the latter method will not only overcome the difficulty of boys looking ahead, but will enable the writer of a book to insert a larger number of types, which can be repeated by the teacher, and at the same time meet the difficulty raised by those teachers who trust to their own invention at the time of teaching that questions tend to become all marbles and oranges. It also means that the teacher must work out the question at the same time as the pupil, which we believe to be essential.

2. Pupils may not get the requisite practice in making written statements. Now, relative to the results of the average teaching, this is not an important objection, for it is the common complaint of examiners that pupils show up figures without statements or explanations of any kind. Indeed, one continually finds a hopeless jumble of digits, among which it is often somewhat of a puzzle to find the answer, and quite hopeless to extract anything else. But in itself it is a most important point, and the teacher cannot be too strict in enforcing that adequate verbal explanation should be made in

every written question which the pupil does. If much of the work is oral, less written work is done, and this work can therefore be more readily and thoroughly examined.

Dr. Young, an American writer on the subject, gives the following as the aims of the teaching of arithmetic :—

(*a*) To teach the child the mathematical type of thought.
(*b*) To arouse his interest in the quantitative side of the world around him.
(*c*) To give accuracy and facility in *simple* computations.
(*d*) To impart a working knowledge of a few practical applications of arithmetic.
(*e*) To prepare the way for further mathematics.

These aims appeal to common-sense. Are they satisfied by the old method of teaching? We venture to think that the scheme outlined above will at least give the necessary opportunities to the teacher to carry out such aims.

We should like to catalogue certain smaller details in which we differ from the older syllabuses and methods of work.

1. Only such units should be employed as the pupils can, at the age, comprehend and be practically shown; but in every case the unit intended should be specified.

2. Short multiplication and division should be used over a considerable portion of the elementary course, so that pupils shall learn to use the simpler methods where possible.

3. The idea of a ratio should be taught early—for example, the method of reducing fractions to their lowest terms should be explained by the idea of equal ratios. (See Laisant, *La Mathematique*, p. 30.)

4. Fractional notation should be introduced very early, and based on a boy's knowledge of such fractions as a farthing, three farthings.

5. Decimal notation should also occur early, and should invariably be based on practical measurements with rulers graduated in tenths. It is important that more than one length should be given in tenths — for example, we may use decimetres, centimetres, and inches.

6. Long multiplications, long divisions, large fractions should be avoided.

7. Practice should only be taught as a shorter method of working out certain sums. It is very doubtful if it has any value whatever except in quite simple cases. It is said that the Egyptians were unable to work with fractions unless the numerators were unity, and we are in much the same position with a practice sum. If we ask a boy to find by practice the value of 23 lbs. at £2, 6s. 8½d., we are really asking him to express $\frac{23}{32}$ as the sum of fractions, with unity for numerator. This is, if anything, harder and nearly as long as the original sum. Again, the longer sums are usually unreal. No one wants to find the value of 2 tons 13 cwt. 3 qrs. 6 lbs. 7 ozs. at £3, 2s. 4d. a cwt. If we sell by the cwt., we do not sell ounces. In the case of a sum like the following—723 articles at 5s. 10½d. each—it may be worth while to find value at 5s., at 6d., at 3d., and at 1½d. each. But the difficulty here is that the child has not sufficient acquaintance with the relation between various sums of money to see at a glance which sums work out best by this method.

8. Much more attention should be given to the local value of digits from the very beginning of arithmetic.

9. A retrograde suggestion. So-called practical methods and approximations have been much heard of during the last few years, but we are fast coming to the conclusion that we have changed King Log for King Stork. An examiner wishes to look up-to-date, and sets an approximation in multiplication, which the boy fails to do unless he has done similar ones the day before. We think there is something to be said for

(*a*) Tests for division of numbers by 2, 3, 4, 5.
(*b*) Short forms of multiplication and division by 25.
(*c*) Contracted division.

As for contracted multiplication, in the first place large multiplication sums are very seldom required, unless logarithm tables are to hand; and secondly, it takes more time to think out exactly what one has to do than it would take to do the sum right through, while at the end one has only gained half a dozen figures, has lost time, and is not quite sure about the degree of accuracy of the answer. The matter would be quite different if we had to do half a dozen every day. This, we think, is the real point about *practical* methods: Are they really practical to the pupil in the present state of his knowledge, and can they be immediately applied with advantage to the working out of the questions he is likely to come across? The practical man does not set up and adjust elaborate machinery to do a simple, small piece of work.

10. The complete omission of dots in proportion. We should substitute a modified unitary method, in which the multiplying factors would be ratios, and the only question asked whether the ratio is direct or inverse. But the whole question of proportion needs long and careful discussion. The questions set are of a careless character, and as often as not contain no real proportion.

11. The frequent use of simple models, to give young pupils clear ideas of area, volume, and geometrical figures, is advisable. If their use can be combined with some suitable practical experiments, such as finding area by weighing or volume by displacement, it would help to clear up the child's ideas.

It is quite impossible in a short article to detail and defend a complete course of elementary arithmetic, but we hope we have outlined clearly many possible reforms. We would advise the teacher of elementary arithmetic to read the recommendations of the British Association Committee, which are clear and for the most part, we believe, sound. Nor is it advisable or practical to urge more than gradual reform. Revolution may be at times good, but always questionably so, and reaction inevitably follows. The geometrical revolution has endangered the existence of geometry in our schools, and we are only now beginning to take a moderate and sane view. But granted the possibility of steady reform in the direction of the tendency of to-day, we envy the schoolboy of the future his arithmetic lesson. The old unintelligent method of teaching by constant repetition and unthinking reiteration will be forgotten; all dull questions with no purpose will have vanished from the text-book; the practical man and the theorist will have compromised, and the teacher be allowed to recognise that, while some of his pupils may be physicists or engineers, others will be the servants of commerce, and the occasional mathematician may be present. Then, too, the English weights and measures will have been relegated to the museum along with that useless lumber compound practice, true discount, and duodecimals. But the ideal is not yet, and between it and the present lie many an examination syllabus and many an old-fashioned examiner.

CAM'RA AND I.

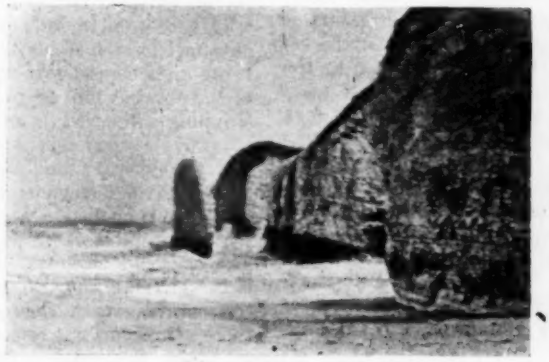
BY LE FLÂNEUR.

OF chalk one may have more than enough in school. To the touch it is dry and harsh—"ask," they say in Yorkshire—and a cloud of chalk from the duster is a thing to set one's teeth on edge. Much pleasanter is it to think of chalk as cliffs in association with happy days at Dover, in Dorsetshire bays, in the Isle of Wight, on the coast of Norfolk, or on Flamborough Head. Recently we have rambled about the chalk country of Hertfordshire, among the Chiltern Hills, and near Radwell, behind a thicket, we stumbled unexpectedly into an old quarry in which an exposure of the chalk is marked off from its crown of soil with all the abruptness and clearness of a geological diagram in a book. As a reference to the photograph will show, the division is as sharp as a line ruled on a blackboard.

CHALK IN THE CHILTERNS.

Chalk is not used only in the teaching of history in school; it has helped to make history. Albion, the ancient name for our country, was bestowed because of the whiteness which the chalk gives to the cliffs at Dover (Latin, *albus*, white) and Lebanon, the mountain range of Syria, has derived its name, not from the everlasting snow that crowns its summits, but from the chalk that forms its cliffs.

In England the chalk stretches across the country in a north-easterly direction from Hampshire, forming around this Hertfordshire quarry the Chiltern Hills, passing onwards through Norfolk into Lincolnshire, and thence to the eastern coast of Yorkshire, where it rears its cliffs above the sea as the striking bluff of Flamborough Head. This main chain of chalk sends out two spurs to the east, one giving us the South Downs, and reaching the sea as Beachy Head, the other constituting the North Downs, and presenting a bold front at Dover towards the shores of France.



AT FLAMBOROUGH HEAD.

Chalk is also under the London Clay, under a great part of our south-eastern counties, under the English Channel, under Paris, and may be traced in different parts right across Europe, and farther east than that into Asia; so that, sitting in our quarry in the Chilterns, or handling our chalk in school, we are in touch with many remote and interesting places, and in touch, too, with an element which occupies a large proportion of the total area of the whole world.

And if chalk connects us with distant places, it links us with times still more remote—so far away and unapproachable, indeed, that any attempt to comprehend the ages which have been needed for the working out of the processes that have resulted in the chalk of this disused quarry will make the brain reel. Millions on millions of years ago those parts of the world where the chalk now lies high and dry formed the bed of a wide sea; and these masses of chalk, which in England attain in some places a thickness of more than a thousand feet, have been formed, incredible as it may well seem, by the slow accumulation of the shells and portions of shells, or of the skeletons, of myriads of organisms no more to be counted than the sands of all the shores in the world, and most organisms so minute—the majority are no more than the one hundredth part of an inch in diameter—that a microscope is needed before we can behold their forms, though we are then able to see that, small as they are, their shape is well defined. Dying, these infinitesimal creatures have sunk upon the bed of the sea, and it is not considered that their remains can have accumulated at a more rapid rate than the depth of an inch in forty years; and as the chalk is in some places more than seventeen hundred feet in thickness, at this rate more than half a million years would be required to build up the masses of chalk that still remain after years of denudation.

Wonderful as is this story of the formation of the chalk, there are none of these operations that have resulted in the production of this white rock that may not be seen at work to-day. No man witnessed the making of the chalk of this quarry, because at that time man had not appeared upon the earth, and there

had not been yet any of the upheavals that gave us the Alps, the Andes, the Pyrenees, or the Himalayas; but to-day, in various parts of the great oceans, when the lead which has been used for the sounding of the deeps is drawn back upon the deck, the mud from the bottom of the sea which still adheres to the lead reveals under the microscope a composition similar to the composition of the chalk in this Chiltern quarry that is now so far inland. If ever the beds of certain parts of the Atlantic, the Pacific, or Indian Ocean are upheaved, then there will have been taken the first great step in the making of future chalk cliffs; and such upheavals are not at all unheard-of movements in our own time. The west coast of South America and other similarly large areas are to-day undergoing the process of slow elevation; the coast of the Bay of Baie has subsided and has been upraised again more than twenty feet even during the Christian era. At the rate of a few inches in a century the coast of Sweden is rising, and the coast of Greenland is as slowly sinking. Several times has our own country been under the sea, and in addition it has been pushed higher out of the ocean than we see it to-day by about five hundred feet, so that none of the operations which have shaped the old chalk cliffs have yet been allowed to slumber, and some of our descendants in the far-away future may yet sit under chalk headlands that are now in the making at the bottom of the Pacific Ocean.

Out of the earth above the chalk a rich flora springs. Even a casual glance at a small part of the soil included in the photograph of the Chiltern quarry revealed the long plumes of the wild mignonette, together with the cinquefoil, field madder, poppy, scorpion grass, nipplewort, knapweed, pigweed, wild clover, hawthorn bushes, and other growths. We disturbed also some birds, so that altogether it is not unlikely that we shall find our way to this interesting quarry again.

FOOD FOR THOUGHT.

INTERESTING PARAGRAPHS FROM THE PAPERS READ BEFORE THE INTERNATIONAL CONGRESS OF SCHOOL HYGIENE.

Child Nature and Routine.

"SCHOOL education is based upon routine. Daily routine in connection with personal habits is the only routine which for young children can be regarded as good. School routine is a hindrance to the development, and requires to be radically reformed. This might be done without delay. Thus: bookwork should be postponed till after eight years of age; objective teaching adopted wherever possible; life histories of all objects used should be first taught. No drill should be allowed before ten. The size of classes should be reduced. In infant schools and rooms used by children under ten, desks should be abolished and the children sit on the floor. There should be no time-tables in infant schools, and a frequent interchange of teachers."—Miss W. HOSKYNS ABRAHALL, M.A., Bristol.

Inspection of Children in Elementary Schools.

"The Bills before Parliament will be of no real value unless the work is done on a uniform system. In most public schools of England there is no medical inspection. Inspectors must be properly qualified, or they will only bring about failure. It will be better to have no inspection at all than an inefficient, badly paid staff. They should be independent officers of the local Education Authorities, having charge of not more than 10,000 children, and a salary of not less than £300 a year. Children will attend school with advantage before the age of five if they are under the doctor's eye. Medical inspection does not merely mean dealing with epidemic and isolated cases, but is a system whereby education will mean the development of the body as well as the mind."—J. WILLIS BUND.

Hygiene of Mind.

"What is Hygiene? A means to strengthen the defences of the body. A hygiene of mind is possible, and specially applicable in the educative period of life. Teachers should know the correlation of mind and body, and education be regarded as mental hygienics. Education should strengthen the qualities that make for adaptability to environment—heredity is all-important. Co-ordination of mind and muscle is the first ideal and inhibition the greatest faculty to be developed. The individualism of minds must be respected in education."—T. S. CLOUSTON, M.D., F.R.C.P., Edinburgh.

Folk-Dancing in Physical Training.

"The immense physiological value of the folk-dances as inspiring a love of physical exercise has been turned to account by utilising the best of the old European dances imported to America. They have been unconsciously developed along the line of neuro-muscular co-ordination, in accordance with true evolution. The dance gives these racially old co-ordinations to the individual. Formal gymnastics have acquired a new interest since these folk-dances have been co-ordinated with physical training. For these reasons we are developing folk-dancing as one of the elements of the physical training schedule in the elementary and high schools of New York City."—Dr. L. H. GULICK, New York City.

The Family and the School with regard to Medical Treatment.

"The necessity for medical treatment of school children depends largely upon the failure of the home environment, and treatment at school would tend to lessen family responsibility, and, therefore, would add to the existing failure. Take a case in point. Spectacles are ordered for a short-sighted child, but are not obtained by the parents. It is argued that, education being an accepted principle, all that tends to efficiency of the child should be provided. But there is a logical stopping-point: it is not the province of the school to provide spectacles, but to discover the educable and to educate; and to see that, by means of other agencies, the deficiencies which make children ineducable are remedied. It is not even the business of the school to interest itself as to these other agencies. The cause of the cry, 'Medical treatment at school,' is the growing knowledge of the value of child life, and the contrast with the ignorance of the parent. But there is no short cut to social reform, and in our anxiety to make the child healthy we may throw aside the last remnants of the tendencies which go to maintain the stability of the family; and, since the family is the greatest and the most sacred of human institutions for the training of the child, such a course is to be deprecated."—Rev. HENRY ISELIN, M.A., London.

The Modern World

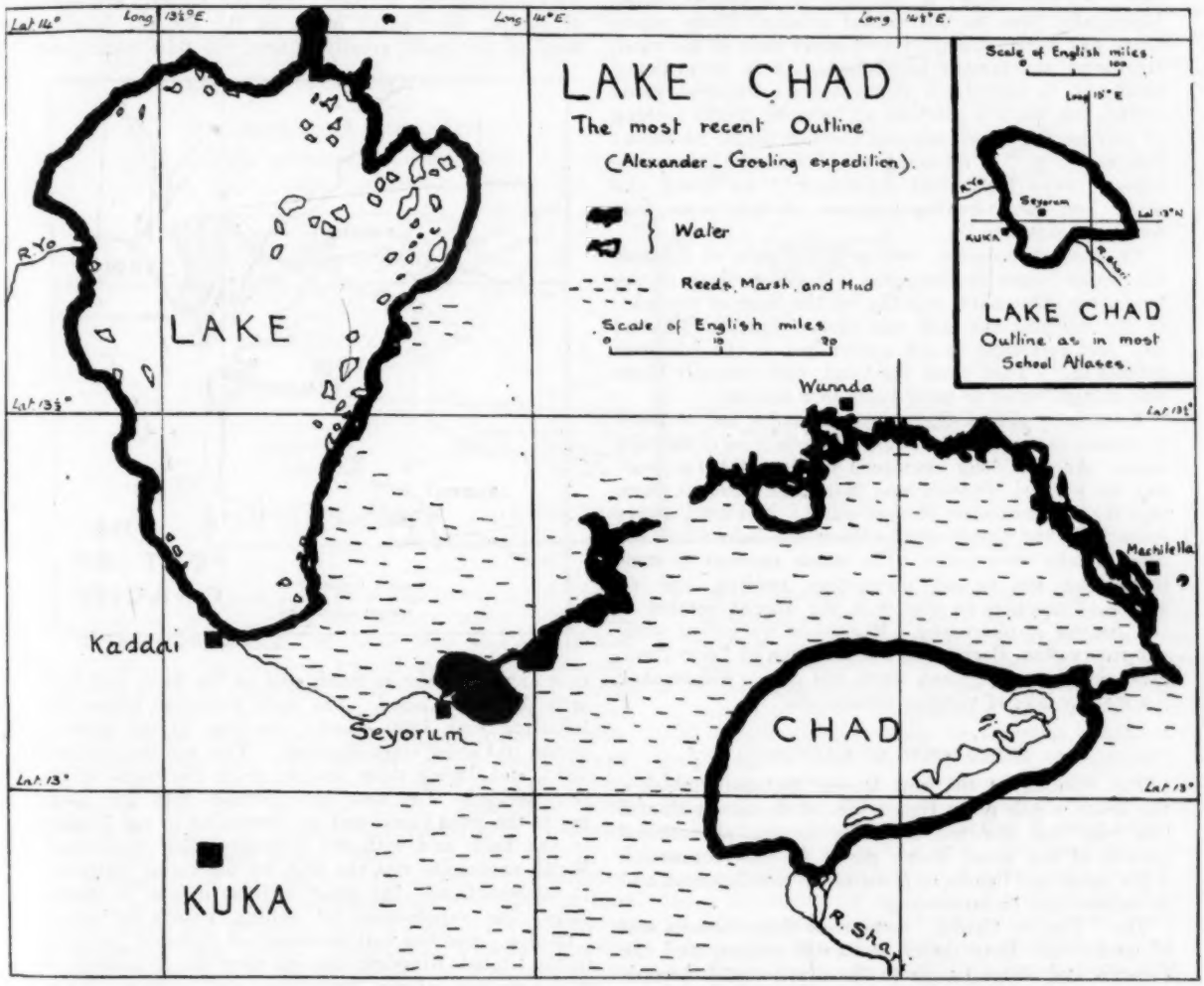
CURRENT EVENTS CONNECTED WITH SCHOOL WORK.

GEOGRAPHY NOTES UP-TO-DATE.

BY E. R. WETHEY, M.A., F.R.G.S.

The Shape of Lake Chad.

As a teacher, one always fights shy of drawing Lake Chad on the blackboard. Lake Superior we know, Victoria Nyanza we know; but there is a suspicious simplicity of outline about Lake Chad—at least as it appears in school atlases—which makes us chary of presuming more than a nodding acquaintance with this the greatest body of water in West Africa. And rightly, for every fresh expedition of discovery in that inhospitable quarter reshapes and remodels the outline of the famous lake. The latest intelligence does not surprise us. There is not one lake, but two lakes! Such is the news brought back by the Alexander-Gosling expedition, which, starting out with the object of systematically surveying a portion of North Nigeria, of exploring Lake Chad, and of demonstrating the wonderful system of waterways connecting west with east, took three years (1904–7) to cross Africa from the Niger to the Nile. We append a rough outline of the lake (or lakes), as portrayed in the *Journal of Geography* (August 1907). It will serve—for a time, at all events.



Incidentally, the expedition was memorable in many ways. It made numerous scientific collections and observations, all of them valuable. It caught an okapi near Angu on the river Welle; it mapped out districts which were practically unknown; and it furnished much new information on tribal distribu-

tion and the orthography of native names. But it paid a heavy price for its work. Of the four Englishmen who started from Lokoja, only one, Lieutenant Boyd Alexander, won through to Khartum. Mr. P. A. Talbot returned home during the Chad explorations, Captain Claud Alexander died at Maifoni (fifty miles south-west of Lake Chad), and Captain Gosling at Niangara (some 150 miles from the Nile watershed).

The Chad explorations practically resolved themselves into the question how to get across the lake from Kaddai to the mouth of the river Shari. There was no way south at all, owing to "dense marsh;" nor could more than twelve miles east be traversed before the boats were stopped by "thick mud." Lieutenant Alexander even tried to cut a passage south-east, during which he came across the remains of an English boat;* but the reeds and the bush were too much for him. All this corner of the lake is, of course, tinted beautifully blue in our school atlases. Even where there was water, it shifted with every turn of the wind. One wind, the famous harmattan, will in its ordinary stride, so to say, force the water six hundred yards inland, but when it quickens up its pace, thinks nothing of driving the flood onwards another couple of miles! One morning, "in retracing our course of the evening before," says Lieutenant Alexander, "we found the water had gone, leaving numbers of fish, some four feet long, stranded."

On another occasion, within half a mile of Kaddai, the water began to disappear; the men slept in the boats, the lieutenant actually on the floor of the lake. In the morning the lake rose earlier than he did, and he "had just time to get out of bed as the lake was getting in." Then came the wind, and presently there was enough water to carry them into Kaddai.

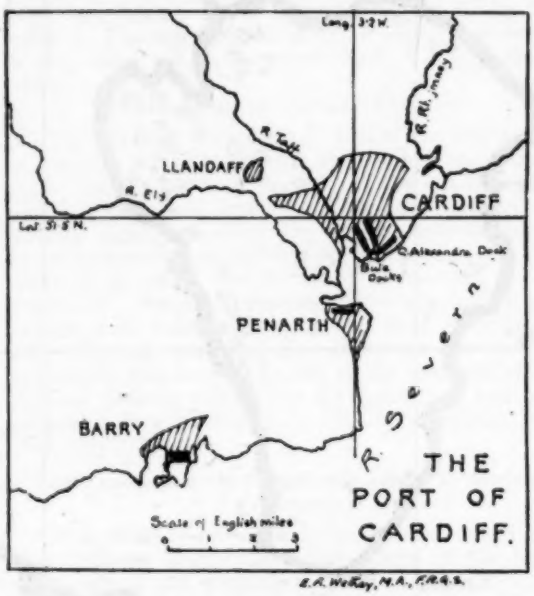
Eventually it took them a month and a half to reach Seyorum, partly on water, more often on mud or through reeds. Another long circuitous and amphibious journey by way of Wunnda and Machilella brought them into the southern sheet of open water. Not until twelve miles from the mouth of the Shari did Lake Chad become a lake once more. The whole account is most interesting, not to say instructive, reading, and we advise all teachers to read it in the August number of the *Journal of Geography*. Meanwhile we accept without reservation Herbertson's description of Lake Chad, given in his most recent work, the *Senior Geography*: "a marshy lake of varying dimensions."

The Growth of Cardiff.

The opening of the new Queen Alexandra Dock—the latest of the great Bute series of docks—at Cardiff this year has directed attention to the phenomenal growth of the great Welsh port. In this connection a few notes and figures in proof of the development and its causes may be interesting.

The "Port of Cardiff" comprises three famous sets of docks—the Bute docks at Cardiff proper, and the Penarth and Barry basins to the south-west. According to the latest annual figures of tonnage cleared—namely, 1906—it is the third port of the kingdom, London naturally heading the list with 16,000,000 tons, Liverpool following with 11,000,000, barely a million in front of Cardiff. The ultimate cause is obvious enough—proximity to the great coal deposits of South Wales, and a convenient position on the Bristol Channel, the natural outlet for the coal exporting trade.

At the beginning of the nineteenth century, Cardiff, standing at the mouth of the river Taff, and within a convenient distance of the mouths of the Ely and Rhymney, was only known as a "creek" of Bristol. Coal even then was its mainstay. Brought down from the hills on the backs of mules, and unloaded on to a primitive quay, this coal was dispatched in the small sailing cargo-boats of the time chiefly to Bristol. The first stage in its modern growth took place in the opening of the Glamorganshire Canal to Merthyr-Tydvil. The next and subsequent stages are marked by the building of its docks. The Bute series began in 1837, under the second Marquis of Bute; the Penarth docks were built from 1865 to 1884; and the Barry docks were commenced in 1889. The last-named, although, of course, they aided much in the general development of the trade, greatly injured the Bute docks, and



now export nearly as much coal as the Bute and Penarth docks combined. The date 1889—or, rather, the following year, 1890—marks the close of the greatest period of Cardiff's development. This era began about 1870, and during those twenty years the trade of the port trebled. The time synchronises with the opening of the Suez Canal and its shortening of the journey to the East, and with the discovery that of all coals Welsh anthracite was the best for bunkering purposes. It witnessed, too, the great increase in size of steamships, the supersession of sailing-vessels by steam "tramps," and the vast extension of railways not only in the United Kingdom but all over the Continent as well. Better labour conditions and greater enterprise on the part of the Welsh ironmasters, who turned their attention to coal-trading as well as to using coal for their own manufactures, aided development, and the result is seen to-day in a comparison of Cardiff as it is and Cardiff as it was fifty years ago. The progress is best shown in the form of a short comparative table:—

* This boat, he conjectured, was the one that Overweg, the companion of Richardson and Barth, took with him in the ill-fated expedition of 1849.

Cardiff.	About 1850.	1906-7.
Population.....	Under 20,000.	200,000.
Dock water area.....	20 acres.	Over 300 acres.*
Coalfield output.....	6,000,000 tons.	Nearly 50,000,000 tons.
Imports and exports....	Under 1,000,000 tons.	Over 25,000,000 tons.†
Shipping.....	One steamer‡ of 600 tons dead weight.	250 steamers, registered at Cardiff, of 100,000 tons dead weight.

* In the proportion of Bute docks 163 acres, Penarth 26, and Barry 114.
† Imports in volume are insignificant compared with exports from Cardiff, and in value are approximately about 30 per cent. of the total value.
‡ The *Llandaff*—not built before 1857.

The great drawback to Cardiff's trade is, as it has always been, its one-sidedness. It lacks an import trade commensurate with its enormous export trade. Indeed, if foreign cargo clearances alone are taken into account, it stands out as the first port in the kingdom, beating London by 1,000,000 and Liverpool by 1,500,000 tons. The minerals in the hills—which, by the way, are some six or seven miles off at least—the means of transport to the coast, and the shipping in the docks, sum up the whole *raison d'être* of the city's success.

Meerschaum—A Rival Field.

A great flourish of trumpets comes from America. Two fissure veins, each containing meerschaum in widths of 20 inches, have been discovered in the Diablo range of mountains, some twenty miles north-west of Pinos Altos, in the State of New Mexico. If this is accurate information, and if the meerschaum can be mined and dispatched by a new wagon road which is said to be in course of construction from rail-head at Pinos Altos, it will mean much to pipe manufacturers. Hitherto the only mine or field which has produced the genuine article in any quantity is the district round Eskishehr in Asia Minor. From here some £50,000 worth is annually exported, chiefly to Brussa for the European trade. Most of it finds its way to Vienna, which has long been the centre of the industry. The supply has been supplemented from time to time by small and irregular exports from Greece, Moravia, Morocco, and Spain. Altogether, extreme scarcity has characterised the production of meerschaum for several years. This may be so no longer. The makers of meerschaum substitutes are in peril.

Meerschaum.

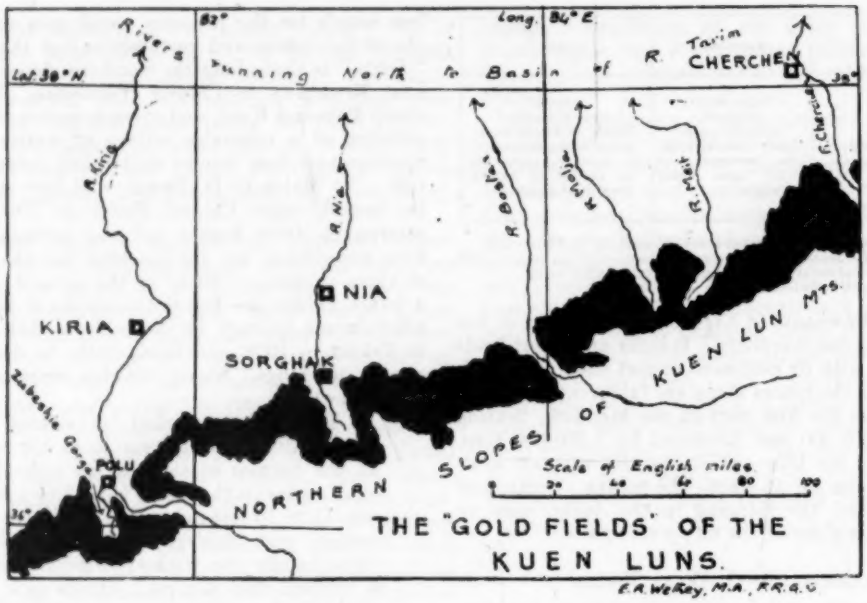
A little-known Gold District.

There are few countries which do not produce gold. From Alaska to Abyssinia, from Siberia to South Africa, in all latitudes and on most altitudes, the ceaseless search for the precious metal goes on. Probably one of the oldest, and certainly one of the least-known "fields," is that along the northern slopes of the Kuen Lun Mountains in Chinese Turkestan. Work begins about Polu and Kiria, and extends eastwards in patches, centring at a miserable village of wattle-built semi-underground huts known as Sorghak (pronounced *Sōr-rāk*). To Major C. D. Bruce, who first made a name for himself under Colonel Bower at Wei-hai-wei, and afterwards (1900) fought and was wounded in the Peking expedition, we are indebted for the latest news of these workings. Early in the present year he read a paper before the Royal Geographical Society on an adventurous journey he made from Leh in Kashmir to Peking in 1906, and incidentally he described these curious workings. Surely nothing more primitive can exist elsewhere:—

> "The gold is worked by sinking narrow circular shafts, varying from 40 to 100 feet in depth. At the bottom of these a low tunnel is made at right angles to the shaft, from 3 to 4 feet in height, and 1½ to 10 feet in width....Ten to twelve men, women, and children work each hole. Some of them handle the rickety windlass by which one is lowered into the pit; others pick out the soil at the bottom of the tunnel; while the remainder sift it over when it reaches the surface. Owing to the absence of water, the soil is not washed, but *winnowed on exactly the same lines as is grain throughout the East.* The final process consists in spreading the residue of the already winnowed soil on felts, then *carefully blowing each handful over* in search of gold" (*Geographical Journal*, June 1907).

It would be interesting to ascertain what results would follow from the application of European or American methods of gold-mining to this Kuen Lun industry. Major Bruce could not enlighten his audience on this point. And it will probably be long before the next European visits the spot. The country is more inaccessible even than the Klondike was. It took the Bruce expedition on one occasion a whole day to cover 1¼ miles in the region of ravines by which the great Zubeshie* gorge near Polu is approached. And no wonder, for although Polu itself stands some 8,000 or 9,000 feet above sea-level, all round are mountain plateaus of 15,000 feet, culminating in giant peaks of over 21,000 feet. Moreover, even when one surmounts these difficulties, there are scores of others awaiting the "pioneer." The country appears to be the begin-

* Zubeshie means "gold-extracting." Along the sides of the great gorge itself are traces of disused "pockets."



ning of the famous loess district which Richthofen described as peculiarly a North Chinese formation, "not knowing how far it extends into Central Asia." Lack of water and dust, dust everywhere, are the characteristics here in Turkestan. Where there are rivers, as at Cherchen, they are continually changing their courses; where there once were flourishing towns, as when Marco Polo visited the place in 1274 A.D., are now sandy wastes and buried ruins. Certainly no immediate rush to the district need be anticipated.

CURRENT EVENTS CONNECTED WITH HISTORY.

BY E. M. WILMOT-BUXTON, WISTONS SCHOOL, BRIGHTON.

Affairs in Morocco.

THE most stirring events in contemporary history during the last two months have certainly been those connected with the state of Morocco. To understand them even with a fair amount of clearness, we must glance very briefly at the condition of the country during the last few years (1904–7).

During the early years of the sultan who has just been deposed, the unrest of Morocco was reflected in those European Powers of whose "interests" she formed a part. France, Germany, and Great Britain were all concerned with her because of her valuable trade in wool, leather, and dates.

France, whose hold over Algeria brought her into the closest connection with the country, was given control and responsibility for order by an Anglo-French agreement of 1904; but Britain was to have free access to the ports and facilities for trade. A similar agreement was made with Spain.

This, however, was too much for Germany, who announced that "she was not party to these agreements," and is said to have stirred up the sultan against France.

These differences were, however, composed in 1905 by the Act of Algeciras; and the European Powers then guaranteed the independence of the country, on condition of the sultan's reforming the conditions of government.

The necessity for this stipulation was soon to be pressed home by the next chapter of events, which reads like one of the brigand tales in which our youth delighted—and still delights.

Early in 1907 the restless hill tribes were stirred up by Raisuli, one of their chieftains, to defy the sultan and to march upon Fez.

Meantime France, pursuing her plan of "peaceful penetration" of the interior, had sent a scientific mission to study its conditions. Suddenly the head of this mission, Dr. Mauchamp, was brutally murdered by the natives.

Rumours began to be spread that the sultan himself had encouraged the hostility to Europeans, of which this was the outcome; and since another French subject had been stoned some months before, France sent a warship and demanded reparation, indemnity, and pledges of a better-ordered and stricter government for the future.

Then, getting no satisfactory reply, French troops were sent to occupy Ujda, an important town not far from Fez.

The sultan, on hearing this, at once assumed a most injured tone, and issued an edict explaining that the French have done all this in defiance of their pledge of independence, "just because, through the wickedness of my people, two French subjects have been killed."

This general stirring up of emotion gave opportunity everywhere to disaffection. A pretender to the throne joined Raisuli in his attempt on Fez, and on May 4 the sultan's brother was suddenly proclaimed ruler by a party that was making a bid for the support and favour of France.

Whilst things were thus tending more and more to a state of anarchy and disruption, a certain military governor or *kaid* of one of the districts of Morocco—a British subject, Sir Harry Maclean—tried to restore order in one direction by inducing Raisuli, the brigand chief, to lay down his arms and to come to terms with the sultan.

At first this seemed quite possible. Raisuli, it is true, made impossible terms as to the expulsion of all Europeans from Morocco and the release of the murderers of the two French subjects, and rejected the offers made by Maclean. Soon afterwards, however, he sent to say he had reconsidered the matter, and would yield his points. Sir Harry Maclean thereupon went out to meet him, fell into his trap, and was carried off a prisoner on July 3. He was permitted now and then to write to his wife and daughter; but as he was constantly being moved about from place to place, no one knew exactly where he was at any given time.

Encouraged by this success, the Moors began a series of barbarous acts, burning villages and slaughtering innocents, until, on July 30, a cruel massacre of European workmen at Casablanca, one of the principal ports, brought Nemesis in the shape of French warships, charged to land troops and to preserve order in this disturbed country.

Through a mistaken order the fort was bombarded instead, and six hundred people, mainly innocent Jews, who had already suffered terribly at the hands of the Moors, were killed or wounded.

(By the irony of fate, it may be noted, the Peace Conference at the Hague was at that very time deciding that a belligerent vessel should not storm an unprotected fort.)

Casablanca was left in ruins.

This regrettable event did nothing to settle affairs, which have become even more complicated of late. A fanatic priest roams the country, preaching a Holy War against all Europeans. The sultan protests against the number of French troops, maintaining that *they* are the obstacle to his maintaining peace. And meantime his brother, who had previously been acknowledged only in a restricted region, has been declared sultan at Fez, the royal seat, so that the reigning monarch has been obliged to quit the city. Of the new sultan, however, a great mass of the population has not so much as heard; and meantime the deposed ruler is hurrying towards a sacred city of the north. If he can secure this, the usurper can be sultan only of the south of Morocco.

The latest news of Raisuli is that his ultimate terms on which Maclean will be released have reached the British Legation at Tangier (September 9), so that by the time these remarks are read the latter's fate will have been decided.

The Riots in Belfast.

During August a serious riot broke out among the coal-heavers, dockers, and carters of the town of Belfast on a question of wages. It was soon found necessary to post soldiers on police duty at certain spots, as some of the Belfast police openly avowed their sympathy with the strikers. The presence of the military, however, infuriated the populace, who took to pelting the soldiers with refuse and stones, and even pulled up the paving stones in front of the barracks for missiles.

At length the mob seemed to get beyond control, and in the space before these barracks a regiment was drawn up, which, after enduring a hail of stones for some hours, was ordered to fire—and, as usual on such occasions, the victims were the innocent ones. A girl who had run out to find her brother and a man returning quietly from his work were shot dead, and many were wounded.

The horror of the scene quickly sobered the crowd, and a gallant effort was made by Catholic priests and Protestant ministers acting in union to prevent another outbreak. While inquests were being held on the victims and help sent to starving families, arbitration between the men and their employers brought the strike to an end.

We may connect the occurrence, if we will, with the riot and disturbance which were Ireland's daily lot in the days of the "United Irishmen," when Grattan's Parliament had fallen, and hatred of all idea of union with England was in the air (1798–1800). In those bad old times, however, the whole rebellion was organised and fanned by some of the priests, who, on the present occasion, have acted as mediators and peacemakers.

But the whole incident in its details bears a much closer resemblance to the affair of the so-called "Peterloo Massacre" at Manchester in 1819, when a regiment of cavalry was sent to charge a mob assembled to hear the inflammatory addresses of the orator Hunt on the need of Parliamentary reform. Six persons were killed and many injured on that occasion, and an interesting contrast was afforded by the sequel to the state of public opinion, under much the same circumstances, at the present time.

Then the result of the "massacre" was the passing of the iniquitous "Six Acts," which forbade "all meetings for the consideration of grievances in Church and State."

Nowadays nothing has been expressed but regret at what has occurred in Belfast, and a strong feeling that the action of the military, though perhaps excusable, is not in any sense to be considered as justifiable.

Home Rule in Iceland.

Home rule has been granted to this distant part of the kingdom of Denmark, and was inaugurated by King Frederick himself at the end of July.

The king was received on landing by two heralds, dressed as vikings, and by a crowd of ladies in white or national attire, who strewed flowers before him as he proceeded to the Parliamentary buildings.

Iceland has had her own constitution since 1874, but until now six of her thirty-six members of Parliament, together with the Minister at the head of her administration, have been selected by the king. It is probable that this arrangement will not exist for the future under her new and completely independent conditions of government.

SCIENTIFIC AND GENERAL NOTES.

BY J. HART-SMITH, A.R.C.SC., F.I.C., BATTERSEA POLYTECHNIC.

Colour Photography.

THE ordinary methods of colour photography require the exposure of from three to six negatives to produce each photograph; but a process has recently been invented by a well-known French firm of plate manufacturers that enables a coloured transparency to be produced from one plate. In the ordinary methods of three-colour photography the three colours are separately photographed, a print from each negative in its proper colour obtained, and the three prints are superposed. If the same result is to be obtained from one

plate, the surface must be divided among the three colours, and the separate patches of each must be so small that they are not distinguishable to the naked eye.

The coloured screen that has the three colours in invisibly small patches is obtained by using starch grains of a uniform size, that have been dyed in separate quantities red, green, and violet. The three lots are mixed so that no colour predominates, and spread upon the glass as a film one layer thick. This is then varnished, and a specially sensitised emulsion spread on the top of it. The exposure is made in the usual way, using a colour screen at the lens. The glass side of the plate faces the lens, so that the light before reaching the sensitive emulsion has to pass through the coloured starch grains, hence the sensitive film will only be affected behind each coloured starch grain so far as the light from the object is of the same colour as the grain. On development, the image appears as a negative, and has to be changed into a positive. This is effected by dissolving out the metallic silver, and then reducing the remaining silver bromide to silver with a developer. The result is a three-coloured grained transparency, in which the truth of the colours depends on the choice of the dyes used to colour the starch grains, the colour screen used to reduce the sensitiveness of the emulsion to blue and violet rays, and the light by which it is viewed.

Motor Fuels.

The Motor Union has recently issued a report on motor-car fuels, in which a very despondent view is taken of the petrol supply. The demand for petrol is increasing at a much greater rate than that of the increase of the supply. In 1904 the consumption of petrol in the United Kingdom was 12,000,000 gallons, while in 1906 it had risen to 27,000,000 gallons. In 1904 the trade price of petrol in London was 7d. per gallon; in 1906 it was 1s. 1d. per gallon. The committee under whose direction the report has been drawn up conclude that the time is not far distant when a substitute for petrol must be found. The supply of other possible fuels is divided into two parts. The first includes all fuels, like petrol, that are limited in amount; they are the hydrocarbons of a specific gravity between petrol and paraffin, paraffin itself, gas, and benzol. The second part contains one fuel only—alcohol; and from the report it is evident that in alcohol produced from vegetable material the motor fuel of the future will be found. Since the publication of this report the firms that control the supply of petrol, chief among which is the Standard Oil Company, have reduced the price.

The Cause of Earthquakes.

Professor See has published recently a paper on the cause of earthquakes and the formation of mountains. He has developed the old idea that the earthquake is due to the explosive power of steam. Sea water leaks through the ocean beds, comes in contact with the heated rocks of the earth's crust, and is then converted into steam. The pressure of this steam forces the lava in a lateral direction, and it may either break out through volcanic vents or lift the overlying strata into mountain ranges. When the movement is sudden, fractures are produced, and these cause the vibrations of the crust known as earthquakes. After great earthquakes there is often observed a subsidence of the sea bottom, and this is supposed to be due to the subsequent condensation of the steam. Professor See rejects the hypothesis which regards the fractures as the result of compressional strains due to the cooling and contraction of the earth's crust, but his explanation does not account for the fact that irregular movements of the earth's axis are greatest when severe earthquakes are most frequent.

The Riddle of the Universe.

To the general public the last part of Sir David Gill's address to the British Association was the most interesting, as showing the lines upon which modern research is conducted. The ancient philosophers, confident in the adequacy of their intellectual powers alone to determine the laws of human thought, did not hesitate to employ the same unsupported means for the solution of the riddle of the universe. Every school of philosophy was agreed that some object which they could see was a fixed centre of the universe, the only point of issue being as to what that centre was. This question furnished them with a subject of dispute and fruitless occupation for twenty-five centuries. The absence of facts, and their entire ignorance of methods of exact measurement, did not daunt them. Now, however, progress is measured more by the amount of honest, well-directed, and systematically-discussed observation than by the most brilliant speculation, and concentrated systematic effort on a special selected problem will be of more avail than the most seemingly inspired but disconnected work.

The spectroscope has shown that many nebulæ are not stars at all, but inchoate masses of luminous gas. Evidence has accumulated to show that such nebulæ are the matter out of which self-luminous stars have been and are being evolved. The different types of star spectra, forming such a complete and gradual sequence, show the complete story of the evolutions of suns from the inchoate nebula onwards to the most active sun (like our own), and then downwards to the almost heatless and invisible ball.

"The stars are the crucibles of the Creator. There matter is seen under conditions of temperature, pressure, and environment the variety of which cannot be emulated in the laboratory, and on a scale of magnitude beside which the proportion of our greatest experiment is less than that of the drop to the ocean."

By patient labour in the minute sifting of numerical results the grand discovery has been made that a great part of space, so far as we have visible knowledge of it, is occupied by two majestic streams of stars travelling in opposite directions. Accurate and minute measurement has given us some certain knowledge as to the distances of the stars within a certain limited portion of space, and from their spectra we learn that the stars of both streams are alike in design, in chemical constitution, and in process of development. Sir David Gill then propounds the riddle of the universe: "But whence have come the two vast streams of matter out of which have been evolved these stars that now move through space in such majestic procession? The hundreds of millions of stars that comprise these streams, are they the sole ponderable occupants of space? However vast may be the system to which they belong, that system itself is but a speck in illimitable space. May it not be but one of millions of such systems that pervade the infinite?

"We do not know."

LITERARY NOTES.

BY R. BRIMLEY JOHNSON.

AUGUST remains, undoubtedly, a season of inactivity. Roughly speaking, the publisher may be busy about the making of books—in preparation for the autumn campaign—but he is still shy of bringing them out while his readers are "on pleasure bent." Holiday fiction, of course, must have been circulated in the early summer. But here, as elsewhere, the recent developments of the reprint market are changing somewhat the colour of affairs. Whereas the bookshops and circulating libraries at the seaside, formerly offering no alternatives to fiction, are now displaying attractive selections from the cheaper literary classics, the more industrious of newspaper readers may learn that new volumes, and even new series, are actually being issued at the height of the silly season.

August Issues.

Taking at random a list of BOOKS RECEIVED TO-DAY from a London newspaper, bearing date in the middle of August, we find *fifteen* items under "new editions and reprints," and but *two* under "fiction." Of these fifteen, one is priced at 7s. 6d. net, a second is in French, and a third is purely devotional. It would seem that, like the poor, the serious public is always with us.

AUTUMN announcements are already upon us, and here we notice various interesting experiments in bookmaking, particularly relating to illustration. The day has come apparently when the old alternative of "a penny plain and twopence coloured" is to obtain a wider significance. The Waverley Novels and others will be shortly presented with pictures in colour, wherein, presumably, the English artificer will take at least one step forward in the patriotic attempt to disprove the old contention that "they do these things better on the Continent." There is, in fact, at least one firm in London which has already produced the finest work in this latest development of the powers of the camera; and there is no reason why we should any longer accept the national reproach. Messrs. Jack, at any rate, are determined at once to make the attempt in a popular form by issuing a series of coloured reproductions from the masterpieces of the great artists at one shilling.

Scott in Colour.

THE policy of illustrating novels can never, we think, be universally commended. It may be regarded as a device of the bookmaker—a concession to the craving for novelty which is certainly but seldom inspired by the true enthusiasm either for art or literature. Have we not all our own image of Scott's heroines? Could any artist satisfy us as an interpreter of Mr. George Meredith? One class of illustration, of course, stands on an entirely different footing. When a book originally appears with illustrations, provided only they are well done, the latter become inevitable. They are part and parcel of the original creation, and the book without the illustrations is actually incomplete. Thackeray and Dickens provide the most obvious and perhaps the most favourable examples of these conditions; but they stand entirely outside the general question. Here the impressions from artist and writer are formed simultaneously; and almost unconsciously we test the excellence of each by reference to the other, yielding equal authority to both.

Pictures in Fiction.

But any novel, not originally illustrated, imposes on the reader certain word-pictures, which, however independently interpreted by individual imagination, must stand for the persons of the drama through all time. The artist, converting the words to form, will always be judged by an appeal to the words, and must frequently submit to an unfavourable verdict.

I have a shrewd suspicion, for example, that those of us who really love the several masterpieces so happily illustrated by Mr. Hugh Thomson, regard his drawings as fascinating revivals of a favourite period and, in that light, as a valuable adjunct to the novels themselves. But once we become really absorbed in Elizabeth Bennett or Emma Woodhouse, we care nothing for their counterfeit presentments. Personally I prefer my texts without interruption, but I should like to see the illustrations of Mr. Thomson and a few other kindred spirits issued separately. They throw many sidelights on the novelists, which are both interesting and instructive. They are genuine works of art.

THE genuine holiday, of course, should be spent out of doors. Books are scarcely essential in the summer time. The emotions, the imaginations, and even romance—pure and simple—may well be laid aside with other brain-exercises called work. R. L. Stevenson, describing the only perfect holiday—the walking tour, in which if possible even the night should be spent on the road—recommends the companionship of one book only, and *that* one we already know almost by heart. This is the real secret of holiday reading: to dip into an old friend, finding by chance beauties hitherto unsuspected, always renewing familiar impressions.

Summer Reading.

Consciously or unconsciously, the reading of a new book must arouse the critical faculties and excite our curiosity, killing idleness. "The importance of being idle" is in danger of being forgotten in these strenuous days. Let us beware of banishing the art altogether. Books, judiciously chosen and wisely handled, are no foes to idleness, but they may easily be so perverted.

IT is so easy, especially for the young and the imperfectly cultured, to exaggerate the influence of literature on life and character. Undoubtedly the man or woman who never reads a book will prove a sorry comrade for any person of even moderate intelligence; but the indiscriminating devourer, even of cheap reprints, will seldom enjoy good mental digestion. We see too many books to-day in the hands of the holiday-makers. Sea-fronts are meant for sea-lovers, who may be none the less book-lovers in due season.

Book Fever.

I often wonder if "practical teachers" ever attempt to really follow the development of their pupils' minds between the end of one term and the beginning of the next. It would require, no doubt, considerable power of imagination; and the possible consequences attending success, the temptation to influence such development, might easily prove a dangerous extension of pedagogic tyranny. "Holiday-tasks," at any rate, are no longer rampant, and many of us would regret the more insidious stimulus to misplaced industry in the form of books recommended for holiday reading.

Educational Experiment.

THE LIFE AND DUTIES OF A CITIZEN.

BY WILLIAM BOYD, M.A., B.SC., LECTURER IN EDUCATION, GLASGOW UNIVERSITY.

IT is an almost universal experience that courses on citizenship are among the least popular on the curriculum of the continuation classes and similar organisations. When one takes into consideration the continually-increasing interest in social and political subjects, indicated, for example, by the rapid growth of the Labour movement, this is, to say the least, a surprising fact. In the circumstances, there ought to be some desire to study political questions; whereas for such classes, students are difficult to get, and still more difficult to keep. The suggestion that rises to one's mind is that perhaps citizenship classes are not conducted on very good lines. Without attempting to pass judgment, I wish to put on record the methods which made a class of the kind under the Glasgow Board Continuation Scheme thoroughly successful.

In the first instance, the course was planned on the ordinary lines. There was to be a double series of subjects: the first on the civic institutions of Glasgow, by a member of the City Council; the second, a course by myself, on what we called "Political Science." The class was to meet once a week for an hour, the greater part of which was to be occupied by a lecture, with a few minutes at the end for questions.

But from the first it was evident that the class wanted a bigger share in the proceedings than we had allotted to them. There were over thirty members of all sorts, from the unskilled labourer to the bank clerk; and a few of them were blessed with strong opinions that made them eager to question and to expound. On the very first night the teacher was "heckled" vigorously; and with questions and expressions of opinion the class lengthened out its time. Taking the hint, we forthwith made the class go on for an hour and a half, and divided the time between lecture and discussion, with the happiest result. If the members were not always relevant, their views could usually be guided by the teacher into relation with his subject.

The only doubt was whether it would be possible to maintain the interest thus created, when we passed to the broader issues of national life, on which their initial knowledge was somewhat scantier. I am inclined to think that, had we followed the course suggested by the usual syllabus or by the text-books, we should have suffered the common fate of citizenship classes. Even the best of the text-books are too academic for the purpose. They presuppose a desire for knowledge which has usually to be created. They analyse and they describe our social institutions, oblivious of the fact that analysis is a habit of mind that few, even of the most intelligent workmen have acquired; and that description—for example, of the constitution and workings of the Houses of Parliament—soon palls, because it has no evident relation to the ordinary political ideas.

The method adopted was simple. It was to state *problems*, not *facts*: in other words, to conceal analysis and description in a discussion that provoked controversy. The best descriptive title of the course would have been "Problems of Democracy." Comparing small things with great, one might compare the method with that of the Greek philosophical schools: the class was set to make opinions for themselves, and rarely given dogmatic statements to be accepted on trust. Take, for example, one of the talks at the beginning of the course on the meaning of democracy. This followed a discussion on political freedom, in which, by many concrete examples drawn from history and from their own experience, the general point had been established that people can only be free who control their governors in some way. But who are the people? Is every man to count for one? In particular, are the people good enough and intelligent enough to govern themselves? Following out these questions, we are placed in a dilemma. The people must govern themselves, or they cannot be free; the people are not wise enough to govern themselves, and so cannot be free. This leads on to the idea of evolution: democracy is an ideal, in progress of being realised; in a word, democracy is an attempt to solve a practical problem. Without going into further detail, the method will be evident. We have to discuss the various institutions of government and law to see how far they make for real democracy. Our question is never, "What does the King do?" but "What is the good of a King in a country of free men?"

In working out a method of this kind, one must, of course, study to establish connection with current politics at as many points as possible. With a little care the teacher can state the *pros* and *cons* of a topic in a way sure to bring the more extreme members of the class to their feet at the end of the lecture, to expose the lecturer's ignorance or to demand further explanation. It is not long before the "fads" of some of the students become apparent; and after that it only needs adroit side reference to get a vigorous discussion on almost any subject.

The method, of course, has its dangers. One has sometimes to skate on very thin ice. The line that divides genial controversy from acrimonious dispute is narrow; and though one wishes to irritate gently to ensure reaction of mind, one has to guard against any hurt to feelings, however ignorant. A more serious danger is discursive discussion: that can only be avoided by a certain dialectical skill on the part of the teacher. Perhaps even discursive talk is not altogether bad, if it keeps up interest in the class and provokes activity of mind. But, of course, the closer the teacher can keep the talk to the subject and the underlying principles, the better for everybody. Finally, the teacher must be on continual guard against partisan statement. For purposes of controversy he may need to emphasise certain aspects of a subject, but his ideal should be to put both sides of the case in such fashion as to provoke the attack of extreme people on both sides. If he has strong opinions and wants to express them, the best method, both from the moral and from the educational point of view, is to translate statements into questions, and leave them to the class as questions.

For classes conducted on the lines indicated, it is important to have a syllabus of subjects that lend

themselves to discussion. It may be of service to sketch briefly one or two courses that have been found to work well. In the first place, the course referred to above may be given.

A. *Municipal Government.* (Ten Lectures.)
The Growth and Development of the City of Glasgow. The City Taxes. The Health of the City. The City as Employer. The City and the Child. The City and the Poor. The City and the Individual. The City and the Districts around.

B. *Political Science.* (Ten Lectures.)
The History of the Government of Free Men. The Development of the British Constitution. The People. Local Government and Industrial Democracy. The Houses of Parliament. Britain and her Colonies. Britain and her European Neighbours. The King. The Future of British Democracy. Human Progress.

In a later course the same ideas were repeated in new guise, under the title of "The Nineteenth Century." (Twenty-four Lectures.)

First Period, 1800–48. *The Period of "Laissez faire."*
The Industrial Changes. The Growth of the Town. The French Revolution. The Romantic Poets. Parliamentary Reform. Municipal Government. The Poor Law. Chartism. Free Trade.

Second Period, 1848–85. *The Period of Transition.*
Revival of the Monarchy. Liberalism. The Franchise. Co-operation. Trade Unionism. The Theory of Evolution. The Victorian Poets.

Third Period, 1885–1900. *The Period of Social Democracy.*
Social Legislation. Municipal Activities. The Labour Party. The New Imperialism. Problems left for the Twentieth Century.

Then for a discussion class on political economy—not a "dismal science" when so treated—the course, followed through twenty-four nights, was as follows: (1) *Rich and Poor*—introducing the fundamental ideas about wealth and its production; (2) *Earning and Spending*—dealing with the earnings of Capital and of Labour on the one hand, and with rent and spending on food and clothing on the other; (3) *Trusts and Trade Unions*—the combination of masters and of men in the organisation of industry.

PHONETICS IN THE TEACHING OF ENGLISH.

BY THOMAS R. DAVIES, HACKNEY DOWNS SECONDARY SCHOOL.

IT would be gratuitous on my part to dilate upon the value of phonetics in the teaching of modern foreign languages, especially as practical teachers are all agreed on the question. I should like, however, to give a brief account of an experiment which I have been conducting since January last in the use of phonetics in the teaching of English to English boys. The class consisted of eighteen boys, the average age being about twelve and a half years; the time allotted to the subject was two and a half hours a week.

I began with a simple explanation of the structure of the throat and of the working of the voice-producing organs; this was supplemented by one or two simple experiments, and further by a few sketches on the blackboard. The time spent upon this was short, because the main object at this stage should be to master the sounds and symbols. Subsequent questioning of the class disclosed a prevailing idea that changes in vowel sounds are due to the voice alone. In order to remove this impression, I pronounced the vowel "o," slowly bringing the palm of the hand towards my mouth, so as to cover it entirely at last. Every boy followed my example, and informed me that there was no change in the sound when the hand was away from the mouth. When the hand was quite close it formed a sort of barrier to the mouth; the boys then noticed a number of variations in the voice, and said that they were caused by the current of air meeting an obstacle in the hand. I was further told that this change in the character of the current of air modified the shape of those parts of the mouth which combine to form a distinctive sound. As a result of this experiment the class could connect the change of sound with the change of position in the parts of the mouth.

The next step was to take the simple single sounds in the alphabet of the Association Phonétique, carefully explaining the position of the lips, tongue, etc., in the case of each sound. It is most important for each boy to see for himself how every sound is produced: the way to do this is to make each boy produce the sound with a mirror in front of him, and supplement all this by drawings on the blackboard. One peculiarity struck me at this point—there was a tendency to pronounce a single sound as a diphthong or a double sound. When a boy produced this double sound he pronounced it again with the aid of a mirror, and carefully noted the position of the parts of the mouth; the class, without exception, saw that these parts changed their position before the sound was completed. They at once connected this change of position with the production of a double sound, and had no difficulty whatever in grasping the complementary principle of a single sound. This idea paved the way for diphthongs such as aɪ, eɪ, aɛ; the best way to grasp the component parts of these sounds is to pronounce them slowly. Strange to say, there was some difficulty in finding the two parts of the diphthong aɛ; the reason is, that in London, and particularly in the East, this sound is almost a simple vowel. The consonants were then introduced, and stress laid upon the position of the lips as the essential factor in their production. The constant use of the idea of voiced and unvoiced consonants tends to put an end to the chaotic ideas produced by our English orthography: to take one example—the letter "c" represents more than one sound, but in phonetics each sound has its own symbol. The consonants and vowels were then grouped to form words.

Now we took up Dr. Edwards' Phonetic Reader, Part I. The class read a piece, which was then taken word by word on the blackboard; after this the class wrote it out as prepared dictation. The next step was to write words in phonetic script on the blackboard; these words were then rendered into English. In the same way I wrote down English words, and the boys put them into phonetic script. Now came the opportunity to put into practice what had been learnt. If in the reading-lesson a boy pronounced a word incorrectly, he wrote the word in the script

exactly as he pronounced it; the one who pronounced it correctly was asked to give the correct phonetic writing of the word: in this way the mistake was shown in a most effective manner. Every case of incorrect pronunciation can be cured in this way. Experience in the East End of London has proved this conclusively—even that peculiar pronunciation of words like "play" (plai) has been righted by continually showing that the correct way is "plei." English boys are very fond of doing things by analogy; but, much to our dismay, they often use it in the wrong way: because Bow is pronounced as it is, they say "bow" (of a ship) in the same way simply because the endings are the same. Write down both words in the script, and the boy sees at once that they are different. It is claimed that phonetics visualises words and sounds, and therefore leaves a deep impression on the boy's mind. Even after weeks of practice we see such symbols as "c" in the middle of the phonetic script; the reason is that boys attribute certain sounds to certain letters of the alphabet; it is only constant repetition that will clear away this difficulty. The *beau ideal* would be to make children familiar with phonetics at the very beginning of their education.

On no account should boys attempt to write a word in phonetics before they have pronounced it for themselves; the practice of finding things out for themselves is essential to the efficacy of phonetic teaching. In many cases boys under my charge have pointed out that they pronounced certain words somewhat differently: whenever there seemed to be grounds for the divergence, I made a practice of allowing the different rendering. This is necessary, because phonetics should be a representation of the spoken language, and not a cast-iron system to which all must conform. Another great difficulty is the correct writing of the symbols—time is too short to pay the attention one would like to this matter, and at the same time proceed to master the sounds themselves. It would be a great boon to teachers to have a phonetic copy-book after the style of those used in writing lessons. The headlines would have to be in phonetic script; the teacher should see that every word was pronounced before it was written, otherwise the book would not justify its existence. It is essential, at the beginning of the course, that boys should see nothing but the phonetic script; but later on they should practise putting phonetic words into English: this, I think, will help the spelling.

Even in the ordinary spelling-lesson phonetics can be used. Group together such words as *ray, bay, nay;* give their phonetic rendering, and then they will be easier to remember. Where there are words pronounced alike but spelt differently, such as *neigh*, (*Lough*) *Neagh*. *nay*, the dissimilarity can be done away with if once the words are written in the script. Very often in the geography and history lessons we come across a word which the class cannot pronounce; once the word is written in the script the difficulty vanishes. The same method holds good with regard to new words in a reading-lesson. We must not, therefore, spend our time putting words into phonetics, and *vice versa;* but we must apply our knowledge, for its sole value lies in its practical application. The last contention is amply proved by the fact that the boys' interest in the subject was greatest when they had to apply what they had learnt; in fact, the early stages of the course was a strain upon the boys and the teacher. In the later stages the class should do the bulk of the work—the teacher should simply be a kind of court of appeal. The knowledge of phonetics now possessed by these boys will be helpful when they begin French, because, with a very few exceptions, the teacher can write down the French words in phonetic script without having to explain the sounds and their production. Phonetics, then, can play a useful part in the teaching of English, and give the boys a good start in the study of French or German.

A TABLE PRACTICE LESSON.

BY T. G. TIBBEY, B.A.

THE following are some notes of a lesson devoted to practising the four-times table, given to a Grade III. class of twelve boys and fourteen girls about eight years of age, in the Horace Mann School, New York.

The teacher wrote on the board:—

$$7 \times 4 = \qquad 5 \times 4 = \qquad \frac{12}{4} = \qquad \frac{32}{4} =$$

The children who knew the answers stood out by the side of their desks, which, of course, were single. When an incorrect answer was given, appeal was made to the class. Afterwards the class was told to count up together by fours, the time being given by the teacher. One voice predominated; the teacher asked, "Who is my leader?" to which the children cried, "Martin." "Ah, I guessed Martin was; let us have half a dozen leading this time." Counting by fours again, stopped at 24; one child called on, "6 fours are 24." This question was repeated until every hand was up. Then two of the rows were told to count together by fours—at first slowly; but the teacher appealed to the other two rows, "Shall we make them go faster?" "Yes;" and faster they went. Again the whole class together; stopped at 40, and a girl called upon; again together, faster at the word "express;" stopped at 44, and another called upon.

A change of method was then tried. "I am thinking that 4 times something is something." Hands were eagerly raised. "You are thinking 4 times 12 are 48"; "4 times 7 are 28"; "4 times 0 are 0," until the right number was mentioned. Then "I am thinking a quarter of something is something," to which similar answers were returned. Repetition of a rejected reply was sharply rebuked.

Next the teacher wrote upon the blackboard:—

$$4)\overline{480} \qquad \frac{32}{4} = \qquad \frac{1613}{4} \qquad \frac{803}{4}$$

$$\tfrac{1}{4} \text{ of } 44 = \qquad \frac{36}{4} =$$

"Who is ready?" Hands were raised. "Margaret may work the first." Margaret did so, and was about to go to her seat. "But you have not done any talking yet." The reply came, "My answer is 120," at which the other children clapped hands. Lloyd was called upon for the next, and gave his result boldly—"My answer is eight." Raymond then worked the third, telling his results, and reading the answer, the class again clapping. Belmont was called upon for the fourth: "Now see if Belmont will remember our trick." The sum having been worked and the answer read, "Did she notice our trick?" "Yes."

"What was it?" "She put down 12, and did not say carry one." When the last two had been worked, the teacher went round and asked each child a question. When an incorrect reply was given she snapped her fingers, whereupon the class called out the right answer. Three children made mistakes. After this the children were told to put their heads down on the desks for a few moments whilst the teacher made some necessary changes.

The management of her class by this teacher was excellent; the discipline was firm and effective, and no attempt was made to take advantage of the very free relations that subsisted. The fact that the children came from well-to-do homes helps to make the following method effective. When heads were raised, the teacher said, "Rosalind, Charles, and Mary will have to give tickets of admission to this class to-morrow morning; these will consist of being able to answer any questions on four times. They must stay outside the room and ask one of the others to tell me when they are ready to answer my questions. Then instead of saying 'Good-morning,' I shall say, 'Eight times four, Rosalind,' or some other such question." Some of the children discussed the fairness of this, mentioning others who had failed; but the teacher pointed out that the three mentioned had evidently been inattentive, and they certainly appeared to feel the rebuke.

A YEAR'S WORK IN ENGLISH.

BY M. TERRY, B.LITT., VICTORIA GRAMMAR SCHOOL, ULVERSTON.

FOR the last year or two teachers of English have been amply supplied with advice on methods of instruction, on standards of perfection to aim at, and on faults to avoid. Compilers of educational blue-books and editors of scholastic journals have indeed "dealt faithfully" with the teaching of the mother tongue. As this implies that English is now attracting great attention, it may not be amiss to give here some account of the past year's work in one school where English is considered of importance.

It is a County Council school, managed by a local committee. Schemes of work have to be arranged and submitted for approval to the Government inspectors, who visit from time to time.

There are six forms and three extra classes for pupil teachers, and an additional one for a few students preparing for the London Matriculation Examination.

For some of these sections the year's work in English was settled more or less by the syllabus for the Oxford Junior and Senior Examinations and for the Government Examination for the Preliminary Certificate; but the making of the syllabus for Forms II., III., IV.*b*, and first-year pupil teachers was left to the English mistress.

The following books were selected for reading and study in these classes:—

Form II. (*a*) *Adventures of Beowulf*; (*b*) *Tales from the Greek*. Both these are the publications of H. Marshall and Sons, and have been arranged for children by Miss C. L. Thomson.

Form III. (*a*) Selections from Malory's *Morte D'Arthur*; (*b*) Selections from Tennyson's Poems; (*c*) *The Black Arrow*. (*a*) Arranged by C. L. Thomson; (*b*) edited by E. E. Speight—both published by Marshall and Sons; (*c*) Cassell's sixpenny edition.

Form IV.*b*. (*a*) *The Heroes* (Kingsley); (*b*) Poems of Gray (consisting of the "Elegy," odes on "Spring" and "On a distant Prospect of Eton College," "The Bard," "Hymn to Adversity"); (*c*) "L'Allegro," "Il Penseroso." (*a*) Macmillan and Co.'s publication, with notes by H. B. Cotterill; (*b*) and (*c*) Carmelite Classics—Marshall and Sons.

P.T.'s I. (*a*) Selections from Wordsworth; (*b*) *Sesame and Lilies* (Ruskin); (*c*) *Kenilworth* (Scott). (*a*) Edited by E. E. Speight—Marshall and Sons; (*b*) published by G. Allen, 1s.; (*c*) Macmillan and Co.

The books in Forms IV.*a* and V. were those prescribed as Oxford Junior texts—"As You Like It" (notes by A. W. Verity, published at the Cambridge University Press); Select Poems of Tennyson (arranged by H. B. George and W. H. Hadow, published by Macmillan and Co.). Form VI. have read "Coriolanus," with North's translation of Plutarch's *Life* (both Clarendon Press publications).

As far as possible the work in composition has been based on the literature taken during the year, though sometimes an essay on a subject of passing interest may have been set. In Form III. these exercises and others similar were done—(1) Write the story of Œnone; (2) What do you think would be the feelings of (*a*) the king, (*b*) the courtiers, (*c*) the beggar maid, when Cophetua chose his queen?

From *The Black Arrow* various passages, such as "The Skirmish in the Dark," were reproduced after a summary from the text had been made under the teacher's direction. "The Adventures of a Knight of King Arthur" formed the title of one boy's contribution to last term's magazine.

In Form IV.*b* descriptions were written of the building of the Argo, the rescue of Andromeda, and the return of Theseus.

The "Elegy" was learnt as recitation, and paraphrasing of parts of the other poems read was taken.

Attempts to write a stanza in the metre of the "Elegy" did not prove very successful. The best was the following:—

> "The village schoolhouse opes its massive doors;
> The boys and girls rush homeward with a shout.
> The wearied mistress leaves her books of lore,
> And blissful stillness fills the ancient house."

It must be remembered, however, that the members of this form are the lower division of the fourth.

Efforts at verse composition were made also in the higher forms.

"Ten lines of blank verse" set as an exercise produced this:—

> "A cottage old stands in a sheltered nook,
> With thatchèd roof and little chimneys three.
> Along the agèd walls the ivy climbs,
> And festooned hangs about the rustic porch.
> In front a little gravel path doth run
> Among the beds of sweet old-fashioned flowers,
> Whose fragrance fills the balmy summer air.
> A pear tree with its luscious fruit grows high,
> Nailed loosely to the moss-grown, crumbling walls.
> This lowly cot a picture fair doth make."

This was written by a girl; one of the boys gave in this attempt:—

> "The fir-trees cast their shadows o'er the lake;
> The mountains rise majestic in the sky,
> Outlined against the shining golden clouds,
> And clothed in purple heather thick. The grouse
> And pheasant join their cry to bellows loud
> Of Highland cattle, which do graze upon
> The pasture green. The breeze that comes from o'er
> The sea doth sigh among the pines and firs,
> And sends the water rippling to the bank,
> Where stand the cattle, grazing quietly."

Sonnets were composed by the pupil teachers after reading and learning "Earth hath not anything to show more fair," and "The world is too much with us."

None of those received have any poetic merit; in most cases the exigencies of rhyme and metre proved fatal to the sense of the lines.

In the sixth form after the play "Coriolanus" had been read and studied in detail, the pupils wrote essays on the characters. Happily, the edition of the play used contained no outline of these in introduction or appendix. The separate speeches of each character were studied; notes were made in class, and then these were reproduced in essay form. Quotations from the text were given to illustrate any trait of character discovered. Menenius was described in this way, and a contrast was drawn between the tribunes Sicinius and Brutus.

With elder pupils it has been found a good plan to give at the beginning of the term the titles of essays to be prepared and written. Geographical and historical subjects have been set to the matriculation class as a rule, but good essays have been written on "The Rise of the English Drama" and on the "Women of Shakespeare."

In the lessons on formal grammar the aim of the teacher has been to make the children realise the practical value of grammar and analysis as an aid to correct writing. In Forms II., III., and IV.*b* the conversion of sentences from direct to indirect speech, from simple to complex or compound, has proved both an interesting and helpful exercise.

Passages for analysis have usually been of some length, and more practice has been given in dividing a passage into separate clauses than in very minutely analysing short complex sentences.

Figures of speech have been explained as they occurred in the reading; in the grammar lessons examples of these have been placed in original sentences.

The aim of the teaching throughout has been to train the pupils to express themselves clearly and readily. To a great extent it has proved successful in this direction; the drawback is that in some cases it has developed an undesirable fluency, and now the lesson which must be taught is that of selection and rejection of subject matter in English composition.

PRESENTATIONS TO PROFESSOR REIN.

Professor Rein of Jena, who has profoundly influenced education in Germany and other European countries, as well as in England and America, attained his sixtieth birthday on August 10. A great festival was held at the Volkhaus in Jena in honour of the professor, and over five hundred friends of various nationalities were present. Presentations were made to him from the various teachers' associations throughout Germany, and speeches were made by distinguished schoolmasters setting forth the influence of his work on the schools. An interesting episode was the presentation of a silver inkstand with an inscription from Professor Rein's English friends. Miss Catherine I. Dodd, the Principal of Cherwell Hall, Oxford, conveyed to the professor the congratulations of her countrywomen who had had the good fortune to come under his influence. In a brief speech she pointed out the change in attitude respecting the training of teachers in England during the past few years. Fifteen years ago she had come to Jena to study pedagogy, the first of her countrywomen who had penetrated to the little town set amid the Thuringian hills, and though the university in those days inhospitably closed its doors against her, Professor Rein gave her a warm welcome and admitted her to his school and seminar.

FAR AND NEAR.

INTERESTING ITEMS, CHIEFLY FROM THE PERIODICALS.

The Value of Evidence.

A RECENT *Strand Magazine* contained a very interesting article on "What is the Value of Evidence?" by Professor Claparede, proving that accurate observation is a comparatively rare faculty. The professor arranged for a masked person to enter his lecture-room and remain some twenty seconds in full view of the students. Subsequently they were examined as to his dress, etc., and only about 59 per cent. of the answers were correct. As accurate observation is one of the most valuable means of acquiring information, this faculty should be carefully trained throughout school life. A test on somewhat similar lines might easily be arranged in any school, and the results would be a useful criterion of the keenness of perception.

* * *

Annotated Editions.

A RECENT number of *Scribner's Magazine* contains an amusing parody of the methods of textual annotation pursued by the pedagogic pedant:—

BAA, BAA, BLACK SHEEP.

Baa, baa, black sheep,	1
Have you any wool?	2
Yes, marry, have I,	3
Three bags full;	4
One for my master,	5
And one for my dame,	6
But none for the little boy	7
Who cries in the lane.	8

L. 1.—"Baa, baa." A favourite phrase in olden times, and still in current use; probably derived from the Latin *beo*, "to make happy."

Was the sheep black by nature, or only for the sake of alliteration?

L. 3.—"Marry." A curious use of the word, probably suggested by the preceding answer, "Yes."

L. 4.—"Three bags full." An allusion to Æolus, King of the Winds.

L. 7 and 8.—Note the ingenious device by which the ethical lesson is conveyed.

Study the text carefully, and calculate accurately what was done with the third bag. Take into consideration all the possibilities—that is, the bag may have been divided among many, or the little boy may have stopped crying.

* * *

The Best Second Language for Englishmen.

MR. SHEPPERTON in a recent number of *School* argues strongly in favour of German in preference to French as a second language. After criticising the relative advance of both countries, he says:—

"Thus, with Germany's population increasing by leaps and bounds, while that of France is almost retrograde; with Germany's ships and business being pushed into all corners of the world, while that of France is mostly in home waters; with the leading position occupied by Germany in science, art, music, literature, commerce, and all that pertains to war; and with the absolute certainty staring us in the face that in all big affairs of the future she must be reckoned with—is it not time, we ask, that our preparatory and other schools awoke to the extreme importance of German as the second language for Englishmen?"

MR. PUGH makes a vigorous rejoinder in the *School World* to the critics of English teaching in schools, and adduces instances to prove that the charges are too sweeping. We give two examples which certainly are as good as could reasonably be expected from scholars of the age given, and which are, in fact, considerably in advance of the average style.

The Teaching of English.

A.

It is dawn. Misty shapes which resemble the ghosts of long-forgotten dawns lift from the waving trees. In the east the sky turns primrose and then red. Then bars of light shoot across the sky, and now the messengers of dawn come speeding from over the distant mountain peaks. *The golden gates open and Aurora comes forth driving her glittering chariot, with a pomp and splendour like ten thousand mirrors flashing in the sunlight.* (*Author ætat.* 13.)

B.

Nearly every day one sees the clouds, sometimes threatening, and at other times rolling by in mighty battalions, grim and gray, with ceaseless energy always advancing to some unseen goal. At other times black, motionless, and silent, sending ominous mutterings. Then this detachment of Nature's artillery, torn by flashes of light, roars with a din which makes all other sounds small in comparison to it. (*Author ætat.* 13.)

THE Ducal Consistory of Brunswick has issued the following instruction to elementary teachers: "It has happened, and not in isolated cases, that birthday and other gifts have been made to teachers by the whole of a class in common or by individual children. The collection of money for such purposes has not unnaturally excited discontent in a number of parents. In any case the acceptance of presents, whether they be valuable or not, is likely to injure the position of the teacher, and to awaken a suspicion, especially among the poorer classes, that he will not have that scrupulous impartiality which the law requires from him. We therefore take occasion to remind all men and women teachers subordinate to us not only that the receiving of gifts that might influence the recipient in the discharge of his duty is prohibited, but also that the receiving of them in the other cases here contemplated is a grave abuse no longer to be tolerated, and to be ended at once wherever it has come into vogue."

Gifts to Teachers.

WHEN it was first suggested by the authorities that students in training should not for the most part be encouraged to take the degree course of a university, the statement was met with a flood of talk about social prejudice and attempts to keep the elementary teacher within a narrow field of education and culture. All this outburst of indignation was, and is, quite beside the question. To be a graduate of a university carries the right to place certain letters after one's name, and to wear, if one wishes, a certain cumbrous and antiquated garment. These two privileges have acquired a prestige that is out of all proportion to their intrinsic value. It cannot be denied that the possession of a degree is a convenient method of expressing a certain amount of book knowledge; but we can see no reason why the letters T.T. (trained teacher) should not be used with just as much legitimate pride as the letters B.A.—*Journal of Education.*

Training or Degree?

OUR old friend Mr. W. E. Sparkes has a very interesting article in a contemporary on the pitfalls of the practical teacher in the subject of drawing. He points out the dangers of falling into grooves and blindly following traditions. Comparing the old method of elaborately-finished drawings for examination purposes and the present unfinished work, he says:—

The Teaching of Drawing.

"Now, however, the pendulum has swung to the opposite extreme. It is become almost a crime to carry any drawing to completion. Misled by this freedom, our students too often refuse to work at a drawing that demands drudgery or even ordinary care. Of course, when a drawing ceases to interest, there is a danger of its becoming more and more wooden in effect and feeling. But if the pupil is urged as an exercise, now and then, to take the sharpest pencil and draw every minute mark he can see on a coloured pebble, on a butterfly's wing, on a variegated leaf, not omitting to trace the most minute changes of curve in outline, he may become so engrossed with his discoveries—for he will be discovering new delicacies every moment—that he may end in finding the exercise delightful."

BACK TO THE LAND.

BY H. LEATHER, SWINTON.

THE question of counteracting the disastrous influences of town life upon the physical, mental, and moral fibre of town slum dwellers has become at once so universal and pressing as to have passed beyond the stage of abstract consideration in many countries. Both in Germany and France physical deterioration is retarded by the fact that the curricula of the schools include comprehensive schemes of physical training, which lead up to the military exercises of the conscription; while, in addition, most schools have their courses of instruction modelled in accordance with local conditions, which, for the greater part, are agricultural.

In Germany, of late years, there has been much corporate activity in the direction of slum prevention by means of scientific town planning, an example which is being closely studied by English municipalities.

In the United States the tendency of rurals to flock townward has induced many education authorities to introduce such subjects as manual and industrial work and nature study in country schools, in order to induce rural youth to remain on the land. In the case of England, however, the question becomes more complicated because the constitution is neither based upon a system of conscription, nor has England the prospect of agricultural success which opens out to her Continental neighbours, or to her American cousins. Although tentative efforts have been and are being made to restrict rural education in this country to subjects a knowledge of which would produce competent agriculturists, there can be no doubt that the general feeling of the nation is strongly in favour of equal opportunity being given in the schools to all children.

And so long as England maintains her commercial supremacy there will of necessity be a regular flow of rurals to the towns, in order to make good the loss caused by the stress of town life.

But such a course, long continued, would gradually drain the country of its best blood by a simple process of exhaustion, unless there were a return current of town weaklings countryward, where, by the recuperative "back to the land" treatment, the ravages of slum life might be slowly but surely overcome, if not in the first, perhaps in the second or third generation. It remains to be proved that such recuperation is possible, and in this connection may be mentioned the success of experiments being made, notably in the

United States and England. At the Waltham School for the feeble-minded in Massachusetts, a farm colony of two thousand acres has been established, where the inmates not only plough the land and produce large crops of corn, potatoes, apples, etc., but help in the construction of farm buildings required for extending the scope of the work. The result has been such a striking improvement in physical and intellectual soundness that applications for admission on behalf of other unfortunates have far outnumbered the available vacancies. A similar experiment, attended with much success, is being made at Sandlebridge in the north of England. The effectiveness of the system of training the unemployed for agricultural work as carried out under the auspices of the Salvation Army may be measured roughly by the readiness with which the men are being received as Canadian colonists.

But perhaps the most recent example is that furnished by the report of an education sub-committee of the London County Council, giving the results of a visit paid to the Industrial School Agency at Llandilo some months ago.

By the regulations of the Industrial Schools Act of 1894, the majority of children sent to industrial schools are placed under supervision until the age of eighteen years. Arrangements have to be made for the disposal of the boys, and for this purpose an agency was established at Llandilo, which is conveniently situated among a large number of farm-holdings in South Wales.

Before being sent to the agency, the boys received training in farm work at the Feltham and Mayford Industrial Schools, after which they were placed with various farmers whose holdings were within reasonable access of the agency.

Seventy-five boys were interviewed whilst working on the farms where they had been sent, and they were found to be exceedingly comfortable, many of them being treated as members of the family. Although in this part of Wales the custom is for farm labourers to remove regularly to other farms upon the expiration of the period for which they have agreed to serve, it was found that the London boys continued to stay with one employer from year to year.

The preliminary training given at the school farms enabled the boys to adapt themselves very quickly to their new conditions of life, with the result that in many cases their employers had granted increases in wages before the times stipulated in the agreements. All the boys were paid board wages, the annual average wage earned by boys under sixteen years being £5, 13s. 6d.; that earned by boys between sixteen and eighteen years old being £6, 15s. 6d.; while that earned by "old boys," who, having attained the age of eighteen years, had passed from the control of the Council, was £12.

The attention devoted to the formation of habits of thrift was shown by the fact that nearly seventy per cent. of the boys had money deposited in the Post Office Savings Bank. Since the opening of the South Wales agency, no less than 1,380 boys, drafted mainly from the Feltham and Mayford schools, have passed through it, and there are now approximately about 300 "old boys" employed in South Wales, most of them in farm work, but occasionally in collieries or on railways.

The following are types of cases given in the report:—

1. Boy, aged fifteen years; employed as farm servant at a wage of £6, 10s. per annum. "Is a good boy. Can milk; helps with the horses, and is very useful. Writes to the school, and has saved money."

2. Youth, aged seventeen years; employed as farm servant at a wage of £9, 10s. per annum. "A good boy, who is getting on well, and means to stay. Can milk cows and manage horses."

3. "Old boy," aged nineteen years; employed as farm servant at a wage of £14 per annum. "Can milk cows and manage horses, and is comfortable, but will leave and go to a farm where the wages are higher. Goes to church. Has not saved, but intends to put some money in the bank this year. Does not want to go back to London."

If it be remembered that every case on committal and transference to the agency represented some abnormal form of viciousness, engendered chiefly by slum environment, the splendid regenerative work of the London Education Authority will be at once recognised as a distinct advance in social progress. And when practical reformers reflect on the enormous amount of vital force which might be husbanded for the national welfare if all the town weaklings could be subjected to the "back to the land" process, organised on the lines of the London County Council scheme, a vision of the Golden Age appears—a time when unemployment, with its attendant starvation and all the vices, shall be no more.

ENGLISH LITERATURE TEACHING IN SECONDARY SCHOOLS.

BY J. DRUMMOND ROBERTSON, ENGLISH MASTER, WELLS BLUE SCHOOL AND PUPIL TEACHERS' CENTRE.

"THE poetry of earth is never dead." True, O poet; but if the words of H.M. Inspector's report on a recent Certificate Examination be taken seriously, it is to be feared that we are on the high road to its execution.

The report reads: "The literature requires more attention, and should not be regarded as mere practising ground for dry-as-dust studies in parsing, analysis, and etymology." Few practical men could read this without seeing how precisely the nail has been hit on the head. Are we not inclined to treat literature scientifically?—inclined to base other subjects on it and connect other lessons with it?

In this age of examinations, any attempt to teach literature seems to relapse necessarily into a kind of dictionary survey and appendix scrutiny, by which an attempt is made to fathom all possible interpretations of poetical phrases in order that the scholar may be armed to defend himself against the multitude of useless questions which now flood our modern school examinations in English literature.

It is a universally-accepted axiom in education that interest must be awakened in the mind of the pupil before he or she will display any aptitude for assimilation of the materials provided. Can it be said that modern methods of teaching literature tend to promote and foster that interest?

One has heard a great deal lately regarding the fallen standard of modern literary tastes. Now, the public taste has fallen because schools have failed to cultivate the love of literature in the present generation; and the public taste will continue to fall as long as schools treat literature in the matter-of-fact way one associates with mathematics or English grammar.

Surely this rule-of-thumb type of lesson is not the means of fostering a genuine affection for the beautiful.

The remedy for fallen literary taste is in our own hands. Let schools teach literature as an art and not as a science. This cannot be done if literature is taught for the purpose of pupils gaining certificates at public examinations. Gosse says in that masterful article recently published, "An Appreciation of Poetry," "The ear of a child may be so delicately taught so as to respond to the intricacies of sound that it may start a tendency in the right direction, and if a young person is conscious of mere sound there is already a sensible advance towards his or her appreciation of the greatest poetry." If this is true of poetry, it is also true of prose; therefore our aim should be to train the ear to recognise the harmony of good diction, and the mind to appreciate the beauty and wholesome influence of pure sentiment. Then may we expect to find once more an upward tendency in public taste.

How can this desirable end be attained? It can only be brought about by the constant association of the child with varied short pieces of the best writers. Thus will he become familiar with different styles, and, although he may not be aware of the fact, his mind will become disciplined, and when he rises to the higher forms in the school he will be able to distinguish between the richness of good literature and the shallowness of bad.

One of the most important things in literature teaching is to see that the piece is presented to the pupils in its most attractive form. In teaching *The Merchant of Venice* to a second-year form of the Board of Education, I have spent the first term of the school year in the most interesting part of the play—namely, "The Trial Scene." No text-books were employed, and the story of the piece was *told* to the class up to the opening of the scene in question. I then read over the scene, explaining details where necessary, and testing the children's comprehension of the facts by occasional questions. After the class had learnt the *story*, I tested and strengthened the children's knowledge by setting compositions on certain parts of the narrative. The scholars were also encouraged to illustrate their essays by drawing sketches of Shylock or some other noted character of the play, and the class was informed that the writers of the best essays would be selected to take a part in acting the portion of the scene learnt during the previous week. This I found very successful in developing the imagination, and it became so popular that competition for the various "parts" became very keen. The play was presented in a real form to the children's imagination, and the lesson was no longer looked upon as "a poetry lesson."

One lesson a week was generally used in this way, varying the portions to be acted, and always selecting different pupils.

The enthusiasm of the class having been aroused by this plunging, as it were, into the most interesting part of the work, I spent the last two terms on the play as a whole, occasionally having portions acted, and constantly drawing out the children's talent by means of written compositions and sketches of the chief characters.

More than once I have heard inspectors complain of the lack of acquaintance of scholars generally with the *story* of the piece they have been studying, though the knowledge of the *language* of the piece has been decidedly good. This is generally due to the fact that in the majority of public examinations for which secondary schools send in candidates, English language and literature are combined as one subject, and consequently the time-tables of schools likewise provide for the lesson as one subject, with the result that these periods generally develop into "mere practising ground for dry-as-dust studies in parsing, analysis, and etymology." Surely our authors never intended their work to be studied etymologically, and certainly they gave little thought to etymology in the selection of their language. They, of course, selected those words which best expressed their thoughts, and we are not studying the author's work at all if we study his language. The *thoughts expressed by the language* are the direct works of the author. These works are often *enriched* by the judicious selection of our best English, and on these grounds it is well to study the history of the language; but let it be studied apart from what ought to be our literature lessons.

To summarise this article, I will briefly tabulate my observations thus:—

1. Refrain from sending junior forms in for public examination in literature.
2. Pay greater attention to the story and context of the piece than to mere constructions and idiomatic phrases.
3. Make the story as real as possible, and endeavour to cultivate the imagination of the class.
4. Abandon prescribed authors and the use of a text-book, though a selected book of short pieces by the best writers, with a brief outline of the lives of the authors appended, is often useful.

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WALL DECORATION IN INFANTS' SCHOOLS.

BY CLARA E. GRANT.

(*Continued from page 150.*)

Arrangement above the Dado.

THE hanging of pictures is almost, if not quite, as important as the choice, and here again it is often a question of time and an obliging caretaker. It is far better to have a few pictures well hung than many arranged in a "crazy patchwork," in which "hanging" is indeed suicidal. "Sistine Madonna" wedged in between a very "Red Riding-Hood" and a flaming tiger loses half her influence, and neither will the Infant Samuel be half so inspiring when he prays between a modulator and a map. We do not wish to draw any rigid line of demarcation between "sacred" pictures and others. In a sense all beautiful things have a sacred side to them, and much harm has been done by the ignoring of this fact by the "unco guid." At the same time, it is well to draw a line, and especially with children, to whom fine distinctions do not appeal. It is well, therefore, to place the strictly "sacred" pictures together. If the school has a hall, it is good to reserve one wall for "sacred" pictures—that facing the children as they stand for prayers. This plan trains children in discrimination, and it is psychological, as it impresses religious truths by objective means, and so conduces to awe and reverence.

A hall is a great gain in the educative use of pictures. It may be well to place here all the larger pictures, for which rooms are often too small. A hall, too, can represent the highest grade of art for infants, leaving the classrooms to be graded according to their inmates. The darker engravings and photogravures, if used, may well be placed in the hall, leaving the coloured pictures for the rooms where the children spend most of their day. It is well, in any case, to separate the colours from the others, as they are often mutually destructive, and are, when mixed, unrestful and disturbing to the eye. A certain balance and symmetry should be aimed at, as irregular lines and spaces irritate the eye.

Although it is a great mistake to crowd pictures, it is often wise to place together, or in one room, a set illustrating a certain theme. Thus the four "seasons" are best confined to one room, whilst in senior schools sets of portraits, or sketches of one phase of nature, a period of history, etc., may be grouped. The King and Queen may well have a space to themselves. We have seen Queen Victoria nearly extinguished between a crowd of landscapes. Kings do naturally live amongst beautiful scenery, but that phase of their lives does not necessarily impress their kingship on budding citizens. Narrow pictures, framed widthways, make excellent borders just above the dado, especially if they illustrate some form of processional sequence which children love—for example, the "Liberty" series of ducks waddling along.

Amongst minor points not to be overlooked is the necessity of hanging pictures as low as is consistent with balanced space. It is a frequent mistake, not only in schools, to "sky" pictures, where no one can examine them, and where the general effect is spoiled. Then, again, it seems best to have a fairly uniform pattern of frame, which, if simple and unobtrusive, leaves the picture to speak for itself, and is more restful in effect.

Arrangement below the Dado.

So far we have referred to the more or less permanent decoration of the walls by the regular school pictures. As new ones are added the arrangements will naturally be changed, and we would here venture to suggest that education authorities, whilst retaining a necessary veto, might allow empty frames, in which teachers could place any new picture they may find. This would conduce to a healthy individuality in the schools, and please the teachers. As, however, wall space is so much broken by windows, etc., and framed pictures are large and heavy, it will not be easy to change or take them down very often; therefore it will be found best to allow children to visit each other's rooms for talks on the pictures, thus providing a welcome change of scene as well.

But the permanent pictures alone will not give us all we want. Young children love variety; their eye soon becomes accustomed to what is always before them. It is well, therefore, to use the lower space of a wall—that below the dado—for a kind of moving panorama of illustrations of current interest. A wooden band is often fixed for this purpose, and on this can be pinned children's own work, the teacher's own illustrations, any picture post-cards, etc., illustrating any lesson, subject, current events, seasonal nature, and so on. Children may be encouraged to bring anything illustrating the work in hand, and these, having served their purpose, can be removed, or perhaps put in the permanent collection.

Picture post-cards, placed within easy reach, could be much more extensively used than they usually are in elementary schools, especially in senior departments, where they could illustrate countless phases of current studies. This plan, besides being informative, tends to develop the classifying habit of mind, which is not too often found even in children of a larger growth. It is quite surprising how commonly one finds scrap-books and post-card albums merely filled with heterogeneous collections, with no attempt at a classification which betokens the orderly mind, which, in its turn, betokens clear thinking. Even in infants' schools sets of post-cards are most useful in illustrating various lines of interest and experience—for example, the seasons, harvest, Christmas, groups of children at play or at work, animals, flowers, and so on. Phases of life unfamiliar to children, but occurring in their stories, etc., are useful. Thus in a town school a valuable set is that portraying village scenes, whilst in the village school pictures of town life can be shown.

Series of Dutch pictures will attract children everywhere by their bold colouring and simple treatment. In a hall they are best framed, and placed along the dado border, which often has a bare appearance where no furniture is placed below. In the rooms they could be mounted on brown paper or on cardboard, and changed as occasion required. As, however, paper

soon curls and spoils, it would be well if frames might be allowed with movable backs, in which sets of cards could be placed and changed at intervals.

Perhaps a word as to the use of the wall blackboard may not be out of place. Blackboards being in themselves not quite things of beauty, yet always facing the children, they may well be used carefully. Useful as they are for teachers' sketches of stories, etc., there is no reason why Jack and Jill should go up the hill for a whole term, just as it seems a pity to leave up for days together fragments of "shop" work, scraps of letters, errors, naughty boys' names, and so on. These may seem to be small points, but, as we have seen, there are no really "small" points in the training of small children.

Value of Pictures.

To the Child.—To dilate upon the pleasure and profit to the children of a well-arranged and well-varied scheme of picture decoration were unnecessary. We have seen that they need not necessarily be costly, though a few intrinsically good pictures should be found in every school. Pictures provide endless scope for language development—the deepening of old impressions and the acquiring of new—whilst each one should be as informative, interesting, and as inspiring as possible. Children will often show a clear vision into the meaning of a picture. "He looks as if he would go right to her," said a child once at the Whitechapel Art Gallery, when looking at a lover reading a poem to his beloved one.

Well-chosen, well-hung, and well-used pictures are bound to have their effect on the present happiness and the future life of the child. Morally, the love of the beautiful will tend to raise the standard of home, of life, and of character all along; and, slowly but surely, the crudities and atrocities seen in so many poor homes should disappear. This, in turn, should mean a demand for a purer and more wholesome craftsmanship in place of the "cheap and nasty" which now degrades both the worker and his work, and which has serious economic results as well.

To the Teacher.—The schools are pre-eminently for the children, and their interests must come first. But may we not say that well-planned walls will have their effect on the teacher, and therefore a healthy reaction on the children? It has been suggested that one reason for the bright and equable temperament of the American teacher is that she works in brighter rooms, and all women love a pretty room. Indeed, whilst all true children's pictures will please the teacher by a reflex action, we would even plead for one or two pictures which, whilst not unsuited for the children, have a specially inspiring effect on the teacher, who sees more of their inner meaning—for example, "A little child shall lead them," or a portrait of beautiful childhood, like that of the "Children of Charles the First."

From no point of view, then, can we afford to waste our walls, or, indeed, any space. "Every available place should be used," said Mr. Blair, the L.C.C. Executive Officer, in a valuable address on "Head-Mastering." "Empty spaces are as expensive as full ones, and all that is lost in this way is so much less to the total amount that can be divided up." Mr. Blair would probably agree that badly-filled spaces are even more expensive than empty ones; and so we end our plea that a careful scheme of wall decoration may play no small part in the education and happiness of infants and of teachers.

THE INFANT VOICE.

BY T. MASKELL HARDY.

(*Continued from page 37.*)

ONE of the most glaring faults in infant-school singing, and one which makes a beautiful and sonorous quality of tone impossible, is the maltreatment of the vowel sounds. Particularly does this manifest itself in London by the manner in which the diphthong OU (pronounced as in *how*) obtrudes itself into the place of others. Nor is London alone in this respect. If teachers will carefully listen to infants singing from the modulator, they cannot help noticing what I may call the OU (*how*) tone of voice which is used, whatever vowel the children may be trying to sing. It is impossible to express this tone by means of phonetics; but if a teacher will sing slowly up the scale (using the sol-fa names), beginning by pronouncing *doh* as *dou* (as in *how*), and KEEPING THE SHAPE OF THE MOUTH EXACTLY THE SAME for each of the other sol-fa names right up to "*dou*" again, she will comprehend the kind of tone which is often the bane of most infant-school singing.

Importance of Good Vowel Pronunciation.

Prevalence of the Vicious "ou" Tone.

She will find out the children's fault because she will be committing the children's sin—that of keeping *one shape of the mouth for each vowel.* On examination it will be found that children committing this error generally sing with the lower jaw rigidly fixed and the lips almost immovable. This habit is the result of heredity, environment, and sometimes laziness. The teacher, therefore, who wishes to obtain good jaw and lip action on the part of the children must create a new environment for them by her own personal example. This can only be done by keeping an exceedingly careful watch upon herself in the matter of pronouncing her vowels, not only in singing, but in every word which she addresses to the children. She must be careful not only to utter each consonant with the greatest nicety and discrimination for the sake of clearness in articulation, but must also give each vowel or diphthong its exact value; and this can only be done by paying great attention to the various shapings of the mouth—by means of the jaw, tongue, and lips—for the correct formation of each vowel or diphthong used. Teachers, generally speaking, pronounce the consonants quite clearly and correctly, but except in the case of those who have made a special study of singing or elocution, the vowels are often not so used as to obtain the best possible tone production, either in singing or in speaking.

Cause of Bad Vowels.

Misuse of Vowels.

It should be clearly remembered that all vocal sound must be produced on some vowel, and that consonants only interrupt the flow of sound, cutting it into certain lengths called syllables. Consonants, although playing a most important part in clear pronunciation, do not aid but hinder the production of good tone. Further, it should be understood that every distinctive vowel is a certain *colour* given by the shape of the mouth to the tone which passes through it from the larynx; that is to say, that the same sound proceeding from the larynx may be given many and various vowel colourings, according to the shape of the mouth through which it passes. Thus, if the mouth be well

Function of Vowels and Consonants.

opened, the teeth some distance apart, and the lips rounded at the corners, so that the mouth assumes almost the shape of the letter O, the sound issuing from the larynx takes upon itself the form of the vowel OH. On the other hand, if the lips be drawn sideways towards the ears, the shape of the mouth being altered accordingly and no cessation made in the flow of sound, the vowel OH will imperceptibly change into that of the diphthong OU (*how*). Again, if the mouth be well opened, with the lips quite apart even at the corners, and the tongue lying almost flat, the sound passing through the mouth takes the form of the beautiful vowel AH (as in *father*). If, however, during the process of singing, the lips be drawn together and the middle of the tongue pushed upwards so as nearly to touch the palate, the vowel form AH at once glides into that of EE (as in *meet*).

How Vowels are formed.

It will be seen, therefore, that the various vowel sounds depend entirely upon the various shapes which the mouth is caused to assume, and that pure vowel sounds can only be produced by careful attention to the correct shaping of the mouth for each individual vowel.

It would be, of course, out of place in a series of short papers like the present to attempt any long and formal course of vowel exercises. A few broad principles, useful hints, and simple exercises, however, will, I think, be useful in helping to obtain good, broad vocal tone, not only in singing, but in everyday speech also.

It needs no demonstration to prove that better vocal tone is naturally produced on the broad vowels than those of a thin, reedy nature. One has only to contrast the tone naturally produced on such broad vowels as AH (as in *father*) and OH (as in *lo*) with that produced on AI (as in *maid*) and EE (as in *meet*) to be convinced of this truth.

Broad Vowels conducive to Good Vocal Tone.

One of the great aims of all voice trainers, therefore, is TO MAKE EVERY VOWEL AS BROAD AS POSSIBLE, even to the point of exaggeration. In order to do this, it is often necessary, especially in singing, to BEGIN A REQUIRED VOWEL ON A BROADER VOWEL THAN ITSELF, causing the broader vowel to slide gradually into that required.

The Principles of the Correct Treatment of the Vowels.

Whenever this plan is adopted, it is of the utmost importance that the TRUE VOWEL, PURE AND UNADULTERATED, SHOULD ALWAYS BE HEARD QUITE PLAINLY AT THE END OF THE SYLLABLE IN WHICH IT IS USED.

Again, the production of some vowels is too backward or too forward in the mouth for the purposes of good tone. To remedy these defects it is the singer's business to endeavour TO BRING THE TOO BACKWARD VOWELS MORE FORWARD, AND TO PLACE THOSE WHICH ARE TOO FORWARD FARTHER BACK IN THE MOUTH.

If the above guiding principles be carefully obeyed, not only will the breadth, quality, and volume of the vocal tone be materially increased, but a remarkable improvement in pronunciation generally will also accrue.

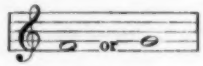
The following exercises, most of which are based upon the excellent teaching of the late John Curwen, will be found of great service in bringing about the above desirable ends. They should, in the first instance, be practised by the teacher herself for her own benefit, and secondly by her class, who should imitate her pattern even to the slightest detail. Before requiring this, the teacher should in each example clearly show the children what is to be done by lips, tongue, teeth, and jaw. The children should watch her every movement while trying to perform the same action themselves.

Exercises, and how to use Them.

There are in general use five vowels upon which *good* vocal tone is almost naturally produced. They are OH (as in *lo*), OO (as in *do*), ô (as in *on*), AH (as in *father*), and û (as in *fur*). Upon these we will accordingly commence our vowel exercises.

The "Good" Vowels.

Exercise 11—the vowel OH (as in *lo*). The tongue lies flat, the lips are rounded almost into the shape of O, the mouth well opened, and the front teeth about half an inch apart (*a*) Sing very slowly on one tone of medium pitch, say F or G—



the following and similar words: *Bow, dough, foe, go, hoe, Joe*, etc.; (*b*) *boat, dote, goat, mote*, etc.; (*c*) *bone, cone, hone, Joan, lone*, etc.—the consonants being frequently varied. Articulate each consonant very clearly, but remember that the aim of this exercise is to obtain beautiful tone upon the vowel OH. Prolong the length of the vowel, therefore, while making each of the consonants as short as possible. Care must also be taken not to *begin* or *finish* the vowel OH by any other inferior vowel. For example, if the lips are pouted or placed too close together, OO (*do*) takes the place of OH, while the drawing backwards of the lips, as in smiling, produces OU (*cow*). The effect then obtained is somewhat as follows: *Boo-oh-oot* for *b-oh-t*, or *gow-oh-ow* for *go*.

Exercise 12—the vowel OO (as in *do*). The teeth are in the same position as for OH; the lips, however, are more rounded, being pushed forward almost as in pouting, while the back of the tongue is raised towards the palate.

As in Exercise 11, sing on one tone the following and similar words, making the consonants as short as possible: *Boo, coo, do, hoot, moon*, etc. Take care that the teeth be well apart, and *kept* well apart until the final consonant is "tipped" off.

Exercise 13—the vowel ô (as in *on*). The mouth and teeth are placed exactly as for OH, the tongue lies lower, the lips are somewhat rounded, but do not touch at the corners.

As in the preceding exercises, sing on one tone the following and similar words: *Cot, dot, got, hot, lot*, etc.

There is a danger of this vowel being produced too far backward and acquiring a nasal quality. This fact should be corrected by *beginning* each of the words in the exercise upon the more forward vowel OO, being careful to *finish* upon ô itself — thus: *Coo-ot, doo-ot, goo-ot*, etc. The duration of the OO is to be made much shorter than that of ô.

Exercise 14—the vowel AH (as in *father*). The teeth are as for OH, but the lips wider apart, not being rounded in any degree or allowed to touch at any point; the tongue is perfectly flat. Sing: *Baa, cart, darn, fast, garb, hark*, etc.

This vowel lends itself to the most beautiful tone-quality when properly generated, but with English people the tendency is to produce it so far backward in the mouth that, like ô, but much more frequently, it is sung with a distinct nasal twang.

As in the case of ô, prefix this vowel with oo, in order that AH may be brought forward in the mouth: *Boo-ah, coo-art, doo-arn*, etc.

Another good plan for securing forward production is to direct the column of sound against the upper teeth, and this is well brought about by beginning the vowel with the aspirate H — thus: *Hoo-ah* (*hah*), *hoo-art* (*hart*), *hoo-arn* (*harn*), etc.

Exercise 15—the vowel û (as in *fur*). The teeth and lips exactly as for AH; the tongue also is perfectly flat, but raised a little higher than for AH. Sing: *Bert, curt, dirt, fur, girl, murmur*, etc.

In my next paper I hope to deal with the most commonly used of those vowels which do not readily lend themselves to the production of good vocal tone, and various devices for the improvement of the tone naturally produced on each.

SCHOOL HYGIENE IN THE INFANTS' DEPARTMENT.

BY MRS. FLORENCE KIRK, BRADFORD.

THE proceedings of the recent International Congress on School Hygiene have acquired additional interest by reason of the passing of the Act for Compulsory Medical Inspection in Schools.

Very interesting and instructive papers were given, chiefly by members of the medical profession who are at present engaged in studying various aspects of school life. It was, however, a matter of general regret and comment that the teaching profession was not officially represented, as the work intimately concerns them, and cannot be satisfactorily carried out without their sympathy and co-operation.

The deliberations of the Congress covered a very wide field, the subjects being grouped under eleven heads, as follows:—

1. The Physiology and Psychology of Educational Methods and Work. 2. Medical and Hygienic Inspection in Schools. 3. The Hygiene of the Teaching Profession. 4. Instruction in Hygiene for Teachers and Scholars. 5. Physical Education and Training in Personal Hygiene. 6. Out of School Hygiene, Holiday Camps and Schools, The Relation of the Home and the School. 7. Contagious Diseases, Ill-health, and other Conditions affecting Attendance. 8. Special Schools for Feeble-minded and Exceptional Children. 9. Special Schools for Blind, Deaf, and Dumb. 10. Hygiene of Residential Schools. 11. The School Building and its Equipment.

Sections 1, 2, 3, 4, 5, and 7 included papers of great interest to teachers of infants, and they would do well to obtain copies of the Congress literature, which will serve as text-books of valuable information, as the following extracts from the presidential address of Sir James Crichton Browne in Section 1 will unmistakably show:—

"The tendency of education in the past has been towards the study of books and words rather than of things, and its basis has been discipline and not health. It has concentrated its attention on the mind and ignored the body.

"This Congress on School Hygiene is an emphatic assertion of the claims of the body in relation to education and of health as the only safe foundation of good citizenship. It aims at drawing together from many countries those who have most knowledge and experience of the condition of physical welfare in school life, and of associating with them the members of various professions the work of which is correlated with these conditions, or is in any way concerned with growth and training in childhood. But it interprets hygiene in a wide sense, and includes in it, not merely sanitary precautions, but all the conditions of human welfare, of intellectual activity, and moral stamina, as well as of somatic soundness and vigour. The mind as well as the bodily framework is to engage its attention, and it seeks, therefore, the co-operation of teachers of all classes.....

"The connection of physiology with school hygiene is obvious enough. The former bears on all questions relating to light, air, temperature, cleanliness, and the general school environment of the child. It supplies guidance in relation to the use of the special senses, gives the measure of growth and fatigue, prescribes what is suitable as regards food, exercise, rest, and recreation at different ages, and ensures the recognition of physical abnormities and departures from health. No teacher in these days can be regarded as thoroughly competent who is altogether ignorant of physiology or indifferent towards it; and so essential is a strict and scientific observance of its monitions, not only to sound and successful education, but to national integrity, that the regular medical inspection of schools and school children, either as a State institution or under local organization, has been established in France, Germany, Belgium, Austria, Norway, Switzerland, Russia, Servia, the United States, Japan, Egypt, the Argentine Republic, and Chili, and will, it is to be hoped, be adopted before long in this dilatory country. Such inspection, thoroughly carried out—and it can be carried out without espionage or any interference with parental control—followed by effective measures, will save untold suffering to countless little ones; will speedily reduce the pitiable regiments of the maimed and stunted and defective that disgrace and burden our civilisation; will yield improved educational results even in reading, writing, and arithmetic; and will in a few years furnish a trustworthy picture of the physical and mental status of the population in urban and rural districts, and thus define with precision the wise course of social reform.

"But psychology stands upon a different footing from physiology, and the school and the teacher, we have been told, can get on very well without it.....Psychology may be useless to the teacher as regards any immediate change in the shape of his pedagogic implements, but it must be of the utmost utility to him in many other ways. The success of his teaching will largely depend on his knowledge of the child's mind and the laws under which it grows in capacity. In every lesson that he gives he is obliged to presuppose the possession by his scholars of certain mental powers developing at different rates; and in certain lessons some acquaintance with elementary psychology is necessary if they are to be truly instructive.....Whether as an aid in his professional work or as an incentive to observation, it is physiological psychology to which the teacher's attention should be mainly directed. The mental phenomena which he has to observe and to which he has to accommodate his teaching are displayed by living organisms, and become more intelligible when connected with brain processes.....The subjects taught in school are comparatively simple and elementary, and

the worth of the teacher must depend, not so much on intellect or learning, as on tact, ingenuity, and his ability to make his subject clear and intelligible to immature minds of different calibre. That power, again, must depend, not so much on adherence to strict rule, as on insight, sympathy, and point of view. Can the teacher understand the mental difficulties and deficiencies of his pupils? Can he stimulate their association centres and fertilise barren brain tracts? Can he awaken the wish to learn and pride in work? The magnetic power, the penetration that enables the teacher to do all this, amounts, in liberal endowment, to genius. But every teacher must have some share in it if he is to succeed in his mission; and the average teacher will, I am sure, find his modicum of it augmented by some psychological training, such as that so happily given by Professor James in his *Talks to Teachers*."

Professor James Sully, M.A., in his able paper on the "Relation of School Work to Healthy-mindedness," pointed out that healthiness of mind is not the uniform result of school training. He described a healthy-minded person as one whose intellectual organs are in a vigorous condition and strongly disposed to exercise their proper functions. "The eagerness of his curiosity as well as its wide range will dispose him to learn as much as possible from others, while a desire to employ all his mental powers will lead him both to think out his ideas for himself and to compare the results with the ideas of others."

He maintained that the school had never been able to do its best, owing to the large classes and inadequate space, and that an improvement of school methods was urgently needed. He showed how the teacher should be in closer and more habitual mental contact with his pupils, and that his attention should be directed to the improvement of their mental power or aptitude rather than to increasing their store of information.

In Section 2, "Medical and Hygienic Inspection in Schools," presided over by Professor William Osler, a very large number of interesting and instructive papers were given, and there was a warm discussion respecting the exclusion of children under five. Dr. Newsholme introduced the subject with a very interesting paper, pointing out the danger to these children of foul air, communicable diseases, and want of freedom; but in the discussion which followed, nearly all the speakers spoke against the exclusion, especially in large towns, but advocated better school conditions than obtain in the majority of schools at present. *Reform*, not *exclusion*, under present social conditions seemed to be the unanimous opinion, and the training given in Belle Vue Infants' School, as described in a previous issue of this paper, was warmly commended by several speakers.

Dr. J. Willis Bund (Worcester) said that children would attend school with advantage before the age of five if they were under the doctor's eye.

This statement was supported by Professor Friedel of Paris, who said that "public kindergartens are a hygienic necessity for any rational elementary school system. Medical supervision should begin there, as it is easier and more likely to prove successful. Methods of public instruction must be modified in order to harmonise with modern ideas of physical, mental, and moral development, which are the outcome of co-operation of pedagogues and school physicians."

"The Co-operation of Teacher and Doctor in Education" was the subject of a paper by T. P. Sykes, M.A., ex-president of the N.U.T., who said that the inclusion of the doctor in the school would be a great help to the teacher who had the welfare of the individual child at heart.

Dr. Marion Hunter (London) showed that mothers would be educated through medical supervision of infants' schools, that power to compel parents to remedy the ills of their children is the first step towards improving the national physique, and that we neglect curable conditions in childhood to treat them later in asylums, infirmaries, and hospitals.

Miss Frances Ivens (London) spoke about the effect of adenoids on hearing, and said that the habit of nasal breathing and the use of the handkerchief should be taught.

The description by Dr. Thiersch of the method of examining children for admission to the public schools of Leipzig was very suggestive, and showed the thoroughness with which this subject has been taken up in other countries.

"The school children in Leipzig have been systematically examined at the beginning of their second term after admission. The preliminary examination of vision and hearing is by the teachers under medical superintendence. Then comes a detailed examination a little later by the doctor, which the parents willingly attend. The doctor delivers a short preliminary lecture on personal hygiene; then in the presence of mother and teacher each child is completely examined, the teacher taking notes for the health card which belongs to each child, and passes with it from class to class. If defects are found, the parents are directed to seek treatment. Subsequent examinations take place at least biennially; more often if defects are found."

In addition to papers dealing with defects of eyes, ears, and throat, investigations with regard to teeth were given by Dr. Wallis of London. Out of two hundred and forty-five children in an elementary school in a poor district of London only four were found to have the normal number of healthy teeth. Early treatment of the teeth was recommended, as the teeth become carious within two years of eruption. An appalling absence of cleanliness and a total absence of evidence of dental conservative treatment was noticed, and that in nearly all cases of extensive dental caries the physical measurements are below the average.

Dr. Myers Coplans (Leeds) alluded to the value of the head teacher in the cause of medical inspection. He showed that teachers know a great deal of the causes of disease amongst the scholars, and that the infants' mistress is in many cases a guide, counsellor, and friend to the parents.

Professor Osler in summing up referred to the climatic conditions of England, and the prevalence of colds amongst children and adults, and also to the numerous cases of rheumatic fever and heart disease. He said that the children of London were healthier than anywhere else, but that their lack of stature was a serious defect. He also referred to the method laid down by Plato centuries ago as the true ideal in education.

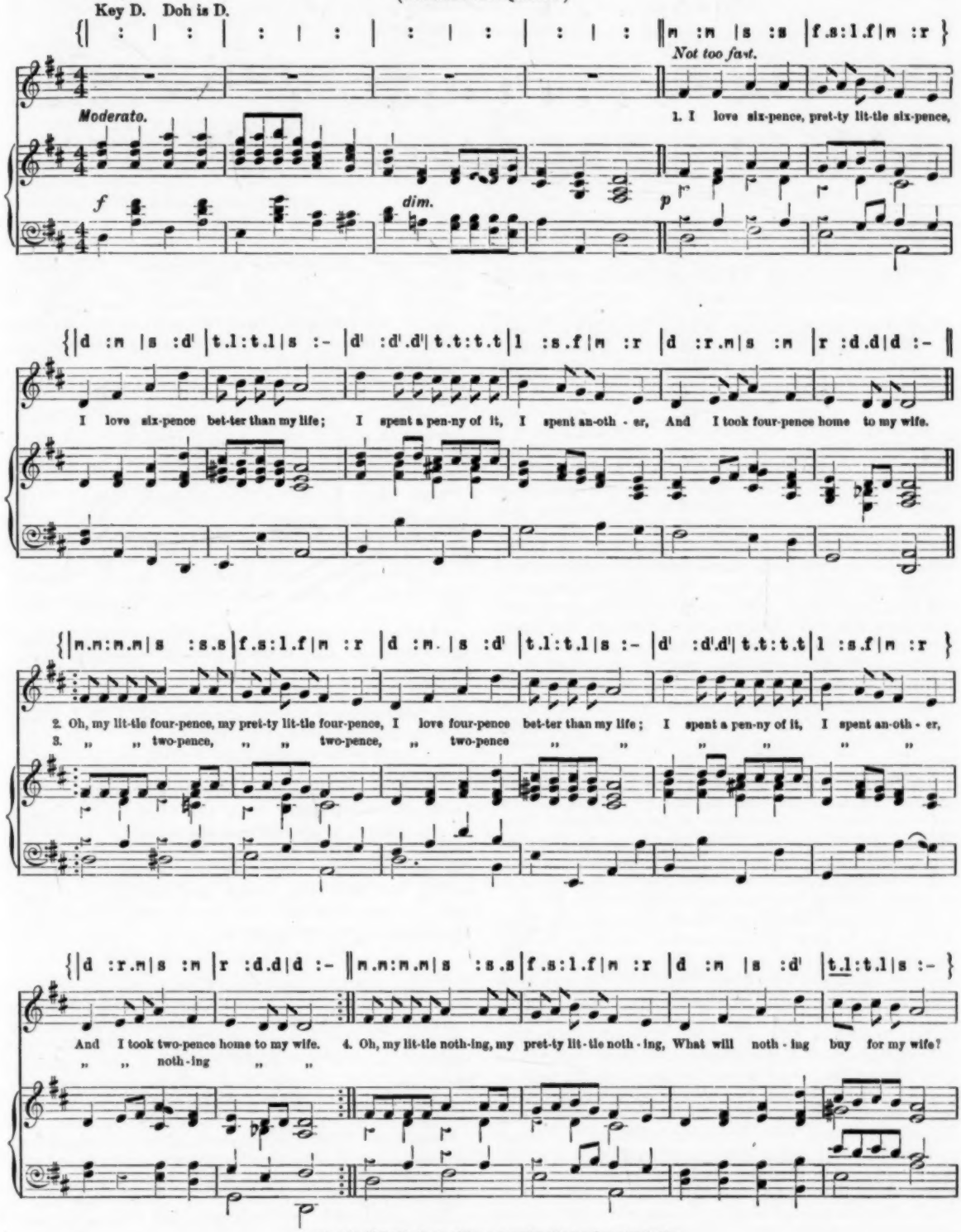
THE PRACTICAL TEACHER.

COMMENCE the work of the winter term by becoming a subscriber to what has been aptly termed as

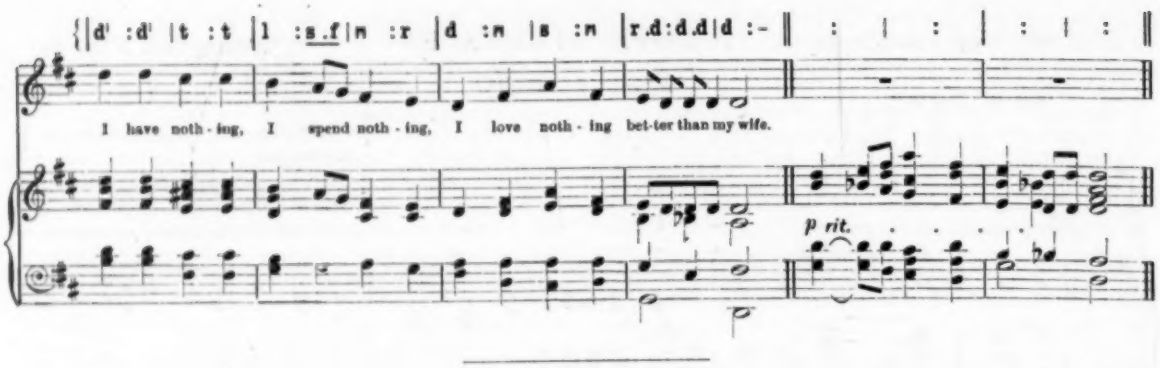
"*The oldest and the newest educational journal.*"

The paper contains articles of interest for teachers of all grades.

Words from "Songs of the Nursery."* **"I LOVE SIXPENCE."** *Music by* THOS. J. HEWITT.

(Musical Arithmetic.)

Key D. Doh is D.
Not too fast.
Moderate.
1. I love six-pence, pret-ty lit-tle six-pence,
I love six-pence bet-ter than my life; I spent a pen-ny of it, I spent an-oth-er, And I took four-pence home to my wife.
2. Oh, my lit-tle four-pence, my pret-ty lit-tle four-pence, I love four-pence bet-ter than my life; I spent a pen-ny of it, I spent an-oth-er,
3. " " two-pence, " " two-pence, " two-pence " " " " " "
And I took two-pence home to my wife.
4. Oh, my lit-tle noth-ing, my pret-ty lit-tle noth-ing, What will noth-ing buy for my wife?
" " noth-ing " "

* No. 1 in Nelson's *Cycle of Song*, a series of school poetry books.



A TALE FOR THE STORY HOUR.

HOW THE TIGER CUBS WERE FETCHED HOME BY THEIR MOTHER; OR, HOW THE ROYAL BENGAL TIGRESS FOUND HER LOST CUBS.

BY Z. A. R. NESBIT.

I.

WHEN Friskie, the baby tiger, first opened his eyes he found himself in a soft bed, lying close to his Mother, with three other little tiger babies asleep beside him. It was his Mother's loud purring that woke him; and when he began to move she turned her great head and looked at him with such loving eyes that no one could have guessed how fierce and terrible she could sometimes be; then she began to lick him very gently. The other cubs woke soon after—the one who woke last was called Sleepie; the others were named Growlie (because he was rather a cross cub) and Shining-eyes (because his eyes looked so bright in the dark)—and then they all rolled and played about together very much like kittens do; and the big royal Bengal tigress looked as gentle and happy as pussy when she purrs because you praise her pretty kitties.

The bed was sheltered by a rock; tall grass and great forest trees grew round it, and a little way off a brook flowed, making a pleasant sound. Tiger Mother had chosen the place because of that brook; for tigers are very thirsty, and like to be near water.

"I shall not have to leave my little ones long to go to drink if the water is near our bed," thought she.

Now it happened that the brook dried up, and Tiger Mother had to go all the way to the river when thirsty. She could not always wait till dark, the proper drinking time; and one day, when she was on her way back to her cubs, she heard a great noise, and saw men with guns riding on the backs of elephants in little houses called "howdahs" (you can see "howdahs" in the Indian Museum at South Kensington if you feel curious about them), and dark-skinned Hindus on foot, making a noise to drive the poor, frightened animals (*game*, they called them) towards the guns. Animals were racing hither and thither, birds fluttering, monkeys chattering and scampering! Tiger Mother *dare* not go back; that might show men the way to her dear cubs. So she lurked in the long grass, hoping not to be seen; but in vain. Men on a great elephant came after her. Then she raced for her life, not towards her home—oh dear, no!—but away for the river. Boldly she swam the wide water, and hid in the jungle beyond. The hunters did not follow, so she kept quiet till night; then she swam the river again, and went home to her babies.

Alas! she found but two; Friskie and Sleepie were nowhere to be seen! Growlie and Shining-eyes crouched together, crying for her.

"Where are your brothers?" asked Tiger Mother, in great fear.

"We don't know," replied Shining-eyes.

"He tried to take me," said Growlie, "but I *bit* him hard."

"He—what—who?" cried Tiger Mother.

"We don't know," said Shining-eyes again. "He doesn't live in the forest."

"*I* never saw him before," said Growlie; "but I *did* bite and scratch him all I could, and he let go."

"Did he take you in his mouth, then?" growled Tiger Mother, in a fury at the thought of her cub being eaten.

"Oh no!" explained Shining-eyes—"in his hand like a monkey, you know; he *was* something like a monkey."

"*No*, he wasn't, you stupid," said Growlie. "He made me *afraid*—monkeys don't. He looked grand and fierce, and he wasn't *furry*."

"It was a hunter," said Tiger Mother, and she howled in despair.

"*Don't*," said Shining-eyes, rubbing his head against his Mother. "I don't think the hunter hurt them; he put them in a bag and took them away."

After this misfortune Tiger Mother knew no rest: she spent half her time wandering about, sometimes calling her little ones, sometimes listening for their voices; the other half she stayed with Growlie and Shining-eyes, to comfort them.

II.

WHAT HAPPENED TO FRISKIE AND SLEEPIE.

Shining-eyes was right. The hunter, a Hindu, did not mean to hurt the cubs. When he found them by accident, he cried out joyfully, "What luck! Here's a fine gift for the Rajah!" and tried to take up Growlie; but, as Growlie told his Mother, he bit and scratched.

Sleepie and Friskie, being good-tempered and fearing nothing, allowed him to lift them up; for which both were very sorry afterwards, for he put them in a bag and carried them off.

They cried with fear and rage, but it was no use; they were jerked and jolted for a long time—how horrid it was!—till at last the hunter opened the bag

on a heap of straw, and let them out in a little empty stable. He gave them some milk in a pan, and left them, shutting the door close.

They cried and cried till they could cry no more, and were obliged to lap a little milk to moisten their poor little throats; then they curled up together, close, *close*, and went to sleep. The hunter came in the day, and brought them warm milk, and stroked them and coaxed them; so they drank the milk and went to sleep again. But at night—the tiger-babies' jolly play-time—they thought of their Mother and brothers, and cried till they could cry no more. This went on for several nights; and all the time Tiger Mother was wandering about, listening and furious.

At last she came near the stable, and heard her dear Friskie's voice. The great howl with which she replied struck terror into the hearts of the hunter and his family, but it filled the hearts of Friskie and Sleepie with joy. They knew their Mother's voice, and cried louder than before. Their Mother answered with such howls and strange, crooning noises that the natives were nearly frightened out of their wits.

"Let's turn the cubs out," sobbed the hunter's wife. "Just listen to her! She'll claw the roof off if she thinks they are here!"

Now that was *exactly* what Tiger Mother meant to do as soon as she had made sure which house her cubs were in. She kept saying, "Where are you? where are you?" in tiger language. The cubs, of course, understood, and tried to tell her, but it was difficult. At last they could cry no more. Then their Mother hid and waited, still listening. Next evening the hunter's wife went to the stable and put the cubs outside; then she *ran* back to her house and shut the door. Friskie and Sleepie at once began to cry, and their Mother to answer them; and oh, what a noise the three made till she found them! She cared nothing for hunters or guns or elephants that might be near the house, but rushed to her little ones, and taking Sleepie in her mouth, called Friskie to come, and set off for the forest. She carried first one and then the other, till she brought both safe home again.

"I'm *so* tired," said poor Friskie.

"And I'm *so comfy*," said Sleepie.

"Tell us all about it," said Shining-eyes, as they all cuddled up together once more.

"Not now—some day so-o-o-o-n, *soon*," purred Tiger Mother, and she purred them *all* to sleep safe and happy; but Tiger Mother herself was happiest of all.

THE LATEST AID FOR TEACHING GEOMETRY AND KINDRED SUBJECTS.

We have received from Messrs. Aston and Mander, Ltd., of 61 Old Compton Street, Soho, London, W., a specimen of *The Geometrigraph*, designed by P. Abbott, B.A., head of the Mathematical Department in the Regent Street Polytechnic. It is a simple but ingenious instrument, consisting of boxwood bars, brass screws, and protractors fastened together so as to form triangles and quadrilateral figures, and should prove useful to teachers in the teaching of preliminary practical geometry which is now so much in vogue. It will be of great assistance in the application of heuristic methods to the teaching of this subject, in checking numerical calculations, in combining hand and eye training with the inculcation of geometrical truths, and in imparting first ideas of trigonometry.

THE STORY OF THE RIVER.

A SCHEME OF CONNECTED LESSONS FOR STANDARD I.

BY E. MONA CLAY AND R. M. M. ATKINSON, INSPECTORS OF SCHOOLS, MANCHESTER EDUCATION COMMITTEE.

Fourth Month.

THE series of lessons for this month are those suggested by the autumn season, notably the time for seed dispersal on every side. The story of the river is further emphasised by lessons on the spider—of which one variety is a water spider—and the water rat or vole. These should of course, if possible, be seen in their native element, and in country places it might be arranged. A ten minutes' watch at the river-side will suffice to see many specimens of the water-rat either sitting on the bank or swimming the stream, and water spiders abound in almost every pond.

I.—SKETCH OF A LESSON ON FRUITS AND SEEDS.

Required for Lesson.

Specimens of the various fruits dealt with in the lesson.

Preparation.

The lesson might be introduced by a brief talk on how the flowers of summer give place to the fruits of autumn. Examples can be given by the children.

Presentation.

I. What is a fruit.—(*a*) Point out to the children that the word fruit has a wider significance than that conveyed by the everyday use of the word. Show specimens, and lead the class to see that a fruit is simply a ripened seed-case.

(*b*) Explain that the seed is that part of the plant destined to produce new plants.

II. The different kinds of fruits and seeds.—(*a*) *Berries.* Trace briefly the growth of a berry from the time of the fading of the flower. Show that the berry is the ripened seed-case, inside of which, embedded in the juicy pulp, are the young seeds. Let the children give examples.

(*b*) *Stone fruit.* Let the children examine a ripe plum. They will notice that this is also what may be termed a juicy seed-case. In this instance, however, there is only a single seed, which the children know as the stone.

(*c*) *Pods.* Show the pods of peas or beans, and point out that these form the fruit of the pea plant and bean plant respectively. The children will be able to tell that the peas and beans are the seeds.

(*d*) *Nuts.* It will perhaps be difficult for the children to realise that a nut is a fruit. Trace the stages in the growth of a nut, and then crack one to show the seed.

(*e*) *Winged fruits.* Show the children specimens of the fruit of the ash and sycamore. Point out that in the latter the fruit grows in pairs, one seed-box being attached to the other. Break a specimen, and show the seeds. Refer to the wings, and tell the class we shall consider their uses in another lesson.

Association.

As it is difficult to find a suitable subject with which to associate this lesson, the children might associate the types of fruits just discussed with such others as they are familiar with.

Formulation.

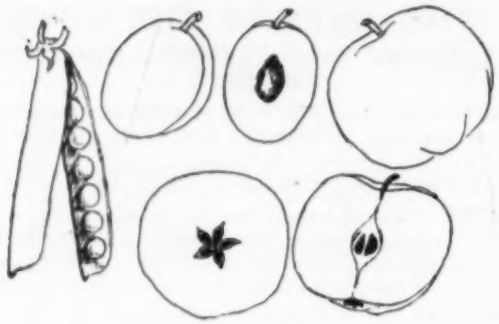
A fruit, whether it be sweet and juicy like a berry, green like a pea, or hard like a nut, is simply a ripened seed-case, which contains the seed or seeds.

Application.

See occupations.

Explanation of Illustrations.

Teacher's illustration.—This represents sectional drawings of the apple, plum, pea. A point to emphasise especially is the difference in the *kind* of seed—whether it is hard like the plum, or soft like the pea, or whether encased in a horny substance, as in the apple. The importance of comparison is pre-eminent in a lesson of this kind.



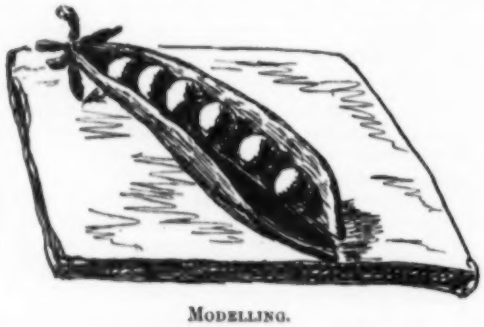
TEACHER'S ILLUSTRATION.

Painting.—The colours required for this are green and purple, and if possible a touch of brown for the branch, though it may very well be painted green if desired. Paint the plum first, as it will take longest to dry. To obtain a purple colour, mix blue—Prussian will do, but only a small touch of it is required—and crimson lake. Do not let the colour be too thick—many paintings are spoilt by this error. Wash in carefully the form of the plum, leaving a white line where shown in the illustration.

PAINTING.

The shapes of the leaves may be just washed in thin colour—sap green, and the stalk may also be painted green. When perfectly dry wash over again those parts represented in black in the picture. This should darken them somewhat, and thus give the idea of a rudimentary kind of shading. Mark also the veinings on the leaves.

Modelling.—This is a model which deft-fingered children love to make. First make a slab after the fashion already described. Three separate pieces of clay will be required in addition to small pieces for the peas. To model the pod take a small piece of clay, and roll it into a cylinder-shaped object, then with the thumb and fingers hollow it out, and make the form of the pod



MODELLING.

from observation of a natural one. Proceed in the same way with the other side of the pod; join these two at the top, and make the calyx and stalk—the calyx should have five points; then roll small balls, and place on one side of the pod to represent the peas. The number will, of course, be suggested by the individual specimen at hand.

II.—SKETCH OF A LESSON ON THE DISPERSAL OF SEEDS.

Required for the Lesson.

Whatever specimens bearing on the lesson can be obtained—poppy heads, ash keys, etc.

Preparation.

Introduce the lesson by a reference to the production of fruits and seeds by a plant. Of what use are the seeds? Why is it necessary that seeds should be scattered?

Presentation.

I. Seeds scattered by the plants themselves.—(*a*) *Peas.* Sketch a pea-pod on the board. Point out the edges of the shell, and describe how the latter, when ripe and dry, splits open and liberates the seeds. Can the children give other examples?

(*b*) *The poppy.* Pass round a few large poppy heads (which can be obtained from any chemist). Let the children note the little holes just underneath what was the stigma. Let them shake the seed-case and observe how the tiny seeds fall through these little openings.

(*c*) *The violet and the balsam.* Describe how the seeds of these plants are shot out of the seed-case when quite ripe. Why is this?

II. Seeds scattered by animals.—(*a*) *Nuts.* Lead the children to see how nuts are often carried far from where they grew through the agency of squirrels.

(*b*) *The seeds of sweet fruits.* Show how the fondness of birds for what is sweet leads them to carry off fruit—such as currants, berries, cherries, etc.—and after eating the pulp, cast away the seeds or stones.

III. Seeds scattered by the wind.—(*a*) Draw a sketch for the class of the plumed fruit of the dandelion and thistle. Of what use are the fine white hairs attached to the seeds? Show how such seeds may float through the air for a considerable distance from the original plant.

(*b*) Refer to the winged fruit of some of our trees. Show specimens of ash keys and sycamore fruit, and let the children find out the use of the "wing." Compare with the action of the wind on the sail of a ship. Tell how these winged fruits hold fast to the tree till the autumn gales come, which will be strong enough to carry them to a distance.

Association.

Associate with the plants of a garden. The seeds of these are carefully gathered by man, and then planted at his discretion where they will best grow.

Formulation.

The lesson might be formulated as follows: Nature has provided plants with various devices by means of which their seeds are enabled to get a favourable start in life.

Application.

See occupations.

EXPLANATION OF ILLUSTRATIONS.

Teacher's illustrations.—These should all be drawn a good size on the blackboard as the lesson proceeds and as each individual fruit and its manner of seed dispersal is referred to.

TEACHER'S ILLUSTRATION.

Painting.—These fruits lend themselves exceedingly well to representation by the brush. Sap green mixed thin will be the colour best adapted for painting the ash keys. The wings of the sycamore fruit should be done by means of brush strokes, and the firm seed at the base by simply painting the shape. Make

the stalks with the brush point, and the markings on the wings very carefully with the fine point of the brush held vertically. When quite dry darken the base of the fruit by a fresh application of colour. The ash keys may be painted in a similar way.

PAINTING.

Modelling.—It is not absolutely necessary to have a slab for this, but it will make it a more finished model and a more educative one on account of the additional muscular exercise involved. To model the poppy head use about 3 ozs. of clay. Divide into three pieces, one a good deal larger than the others for the body of the fruit, and two other smaller ones for the top and stalk. Roll a fair-sized ball and flatten it at one end: this will be the top of the fruit. Now roll a small piece of clay first into a ball, then flatten to the size of the form already made;

MODELLING.

place it on the top, and make the indentations as shown in the illustration. A hole must also be made just beneath each scallop of the kind of rosette formed by the indentations. This may be done with the point of a slate-pencil or some other rather sharp instrument. Add the stalk, with a kind of collar near its union with the ball-shaped fruit. Place carefully on the slab.

III.—SKETCH OF A LESSON ON THE SPIDER.

Required for the Lesson.

A spider's web (which may be lifted on a small sheet of cotton wool) and any other specimens that can be obtained.

Preparation.

Refer to the lesson dealing with the insects found about the river-side. Let the children tell what an insect is, and point out that they are going to talk about a little creature which resembles an insect, but is not one.

Presentation.

I. Appearance.—(*a*) *Body.* Let the children examine the teacher's sketch, note the construction of the spider's body, and find out wherein it differs from that of an insect.

(*b*) *Legs.* Allow a child to count and find out that the spider has four pairs of legs, which are very long and covered with hair. Each foot has three claws provided with teeth something like a comb.

(*c*) *Eyes.* Refer to the eyes, eight in number, placed on the top of the head.

(*d*) *Fangs.* Describe briefly the use of the fangs. Compare with the "mask" of the dragon-fly.

(*e*) *The spinnerets.* Tell the children about the tiny lumps on the under-side of the body, which exude the gummy substance used in the spinning of the web. Show how the comb-like claws assist in this process.

II. How the web is made.—The spider spins one long thread and fastens it on to something secure. From this other threads are fixed to convenient points, forming the outside boundary of the web. Threads are then laid across, all passing through one centre like the spokes of a wheel. Spiral threads studded with drops of gum are then stretched round and round till the web is complete.

III. Why the spider spins.—(*a*) To make a home. Describe the homes of the trapdoor and water spiders.

(*b*) As a means of procuring food. Refer to the different devices adopted by spiders to catch their prey.

(*c*) To form a covering or case for the eggs.

(*d*) To provide itself with a means of passing from one place to another. Show how this compensates for the absence of wings.

Association.

Associate with an insect such as the fly. Let the children find out and discuss the points of difference between a spider and a fly.

Formulation.

A simple generalisation in the children's own words.

Application.

See occupations.

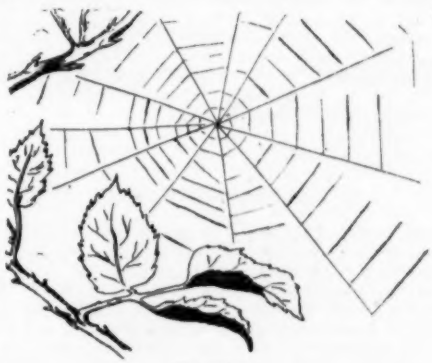
EXPLANATION OF ILLUSTRATIONS.

Teacher's illustration.—This represents the different parts of the brown spider. The children's attention will be drawn to the difference between the spider and an ordinary insect. The hairy,

TEACHER'S ILLUSTRATION.

jointed legs, the clawed feet, and the spinning area will all be intensely interesting.

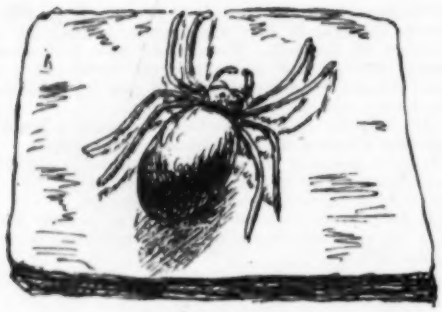
Painting.—This will be found a most engrossing lesson. The exercise may be rendered either in sepia or the leaves may be painted green and the web brown. Paint the leaves and branch



PAINTING.

first, then the radiating lines for the web, starting from the centre. The fine point of the brush must be used throughout in painting the web.

Modelling.—It will be best to make a slab for this—as for any object not absolutely solid. Roll a small oval for the lower part, and another very much smaller for the upper part. Note that the spider has two parts only to its body, the head and thorax being joined together in one. Add two small antennæ—not really antennæ, it may be remarked, but poison fangs, more



MODELLING.

correctly speaking—and eight legs formed of pieces of clay rolled very thin. They must be attached underneath the upper part, or what is called the cephalo-thorax.

IV.—SKETCH OF A LESSON ON THE WATER RAT.

Required for the Lesson.

Pictures of the water rat and the common rat.

Preparation.

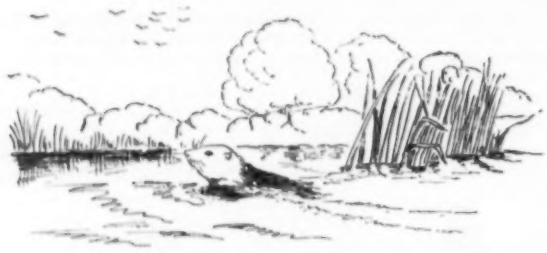
Refer to rats and mice in general. See if any of the children keep white mice or rats as pets. Tell them the water rat is really only a sort of cousin to the ordinary rat, and belongs to the group of animals known as "voles."

Presentation.

I. Appearance.—Let the children examine sketches of both the water rat and the ordinary rat, and find out that the former is slightly smaller in size and broader and plumper in build than the latter. Its neck is short and thick, its head round, and its snout short, forming a marked contrast to the rat.

Let the children point out the difference between the rather short, hairy tail of the vole and the long, thin, smooth tail of the rat. Compare the reddish brown fur with that of the squirrel, and contrast with that of the rat.

II. Food.—Refer to the vegetation about the parts of the stream frequented by the water vole, and tell the class that its food consists of the roots and pith of flags and rushes, and also water plants such as the duckweed. Very often, however, it leaves the water-side, gets on to the farmer's land, and helps itself to grain, potatoes, and turnips.



TEACHER'S ILLUSTRATION.

III. Habits.—Point out to the children that to find the home of the water rat they must examine the banks in some sheltered part of the stream, when they may come across a hole that forms the entrance to a long burrow. (Refer to the burrows of the rabbit.) In this winding passage may often be found a nest of dry grass and leaves, and generally a heap of potatoes, beans, and other such foods, which are stored up for winter use. Compare with the way the squirrel gathers together a hoard for *its* future use. Show how the water rat repays the farmer for its food by keeping down the worms and grubs.

Association.

Associate with the common rat.

Formulation.

Let the children give a simple description of the water vole, pointing out how it resembles and how it differs from its relative, the ordinary rat.

Application.

See occupations.

EXPLANATION OF ILLUSTRATIONS.

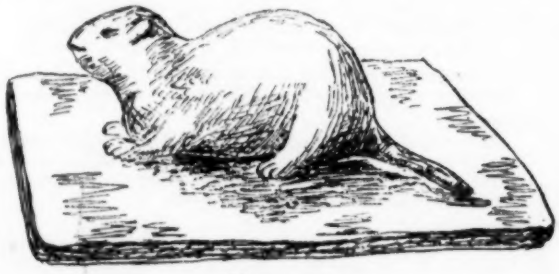
Teacher's illustration.—This represents the water rat in its native sphere in mid-stream. This should be drawn on the blackboard previous to the lesson.

Painting.—If this exercise is well done it should not have a heavy look about it. For the most part bulrush painting is a failure because the bulrushes are made too large. Green and brown are the colours required. Vandyke brown is the most

PAINTING.

suitable shade for the flower of the bulrush. The whole should be done by strokes of the brush, the aim being to avoid stiffness.

Modelling.—This model is not so difficult as it looks, and *may* be made from one piece of clay. Make a cylinder out of about 2 ozs. of clay, rather point one end for the head, and by manipulation make the curves as shown in the illustration. Take pieces of clay and add to form the feet, and mark upon these for the



MODELLING.

toes. Make holes, into which insert the ears, and put also two holes to represent the eyes. Roll a piece for the tail—note that the tail of the water vole is not as long as that of the ordinary rat—and insert at the back. It may be placed on a slab or not, as thought best.

NEXT MONTH

the *Practical Teacher* will contain an interesting and helpful paper on "The Geography of the Primary School," with specimen schemes of work which have been actually tested in several of the largest schools in the country.

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CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

Recent Work on Osmotic Pressure.—During the last two years much experimental work has been done on the subject of osmotic pressure. In order to supplement the information found in recent text-books, the following *résumé* of recent work will be found useful.

An important series of measurements of the osmotic pressure of solutions of cane sugar has been made by H. N. Morse and J. C. W. Frazer. Great care was taken in the selection of porous cells and the deposition of continuous copper ferrocyanide membranes within them.

After testing nearly five hundred cells made at various potteries, the authors did not find one suitable for exact osmotic measurements, but eventually they succeeded in making in the laboratory several cells possessing the required properties. The formation of the membranes within these cells and the mode of connecting the manometer are described in great detail in their papers. After many experiments had been made it became apparent that the experimenters had not devoted sufficient attention to maintaining the temperature absolutely constant while osmotic equilibrium was being reached. Even comparatively slight fluctuations of temperature may, if rapid, lead to considerable error in the measurements of osmotic pressure, owing to the slowness with which water passes through the membrane. A thermostat was not used, but in the later experiments the cell was enclosed in a felt-lined box. This secured a slow variation of temperature; but even on the same day the temperature change sometimes exceeded 1°, and on successive days the temperature varied by 3° or 4°.

All the measurements were made in the vicinity of 20°.

Solutions of thirteen different concentrations were examined, ranging from normal down to 1/20 normal. These solutions were made up by weight, and the specific gravity of each solution used was carefully determined.

The results may be summed up as follows: Cane sugar dissolved in water exerts an osmotic pressure equal to that which it would exert if it were gasified at the same temperature in the volume, not of the solution, but of the pure water contained in the solution. Thus the solution which exerts an osmotic pressure at 0° of 22·4 atmospheres is not that which contains 1 gram-molecule or 342 grams of sugar in 1 litre of solution, but that which is made by dissolving 342 grams of sugar in 1 litre of water. It may be noted that they use in their calculations the gram-molecular volume for hydrogen as determined by Morley—namely, 22·488 litres—and not the normal value, 22·412 litres.

After the conclusion of their first experiments they came to the conclusion that the chief errors were due to (1) thermometer effects, or temporary fluctuations of pressure which follow changes of temperature; (2) uncertainty as to the volume at the head of the manometer; (3) sugar inversion.

The above-mentioned experimenters, in co-operation with B. S. Hopkins, have now described in great detail the precautions which they have taken to avoid the above errors. In carrying out their latest measurements an additional source of error was met with—namely, the growth of *Penicillium glaucum*. It was found, however, that the growth of this fungus could be entirely prevented by the addition of thymol in quantities so small as not appreciably to affect the osmotic pressure. With regard to the driving of the air from the pores of the cell by electric endosmose, better results are now found to be obtained with solutions of lithium chloride than with the potassium sulphate formerly employed.

In extension of previous measurements, H. N. Morse, J. C. W. Frazer, E. J. Hoffman, and W. L. Kennon have carried out an exceedingly careful redetermination of the osmotic pressure of solutions of sucrose of various concentrations, using a thermostat, and with the elimination, as far as practicable, of all known errors. The amount of inversion taking place in the sugar solutions was determined polarimetrically, and the necessary correction introduced. The results, which the authors consider to be as precise as they can hope to obtain under the present conditions, confirm their previous conclusion that sucrose in aqueous solution exerts an osmotic pressure equal to that which it would exert if it were gasified at the same temperature and the volume of gas were reduced to that of the solvent in the pure state. It is, however, uncertain whether the standard for the volume of the solvent is its volume at maximum density or at the prevailing temperature.

The following table gives the results obtained. In connection with this it should be again noted that the gram-molecular volume of hydrogen is taken as 22·488 litres, and the molecular weight of sucrose is taken as 339·60 (on the basis of H = 1).

Weight—normal concentration (molecules in 1,000 grams of solution).	Observed osmotic pressure (atm.).	Theoretical gas pressure at same temperature.	Mean molar weight, calculated from osmotic pressure.
0·1	2·51 2·55	2·42 2·43	325·21
0·2	4·72 4·78 4·81	4·79 4·80 4·81	341·87
0·3	7·24 7·20	7·21 7·16	338·29
0·4	9·64 9·69	9·61 9·63	338·12
0·5	12·06 12·22	12·06 12·10	337·89
0·6	14·74 14·70 14·77	14·55 14·55 14·54	335·24
0·7	16·95 16·96	16·94 16·93	339·55
0·8	19·30 19·39	19·35 19·36	339·78
0·9	21·82 21·91	21·86 21·86	339·51
1·0	24·42 24·05	24·19 24·28	339·56
		Mean.....	337·59

In connection with the value given above for the molar weight in 0·1 normal solution it should be remarked that in their experiments in 1905 the mean value obtained was 336·8.

In a paper "On the Nature of the Process of Osmosis," L. Kahlenberg communicates a large number of qualitative experiments to demonstrate that the action of the semi-permeable membrane in osmotic experiments depends on its selective solubility for solute and solvent. Quantitative measurements were also made, using caoutchouc membranes and solutions of sucrose, lithium chloride, and silver nitrate in pyridine, and it was found that concordant results could only be obtained when the solutions were stirred—a behaviour which the author attributes to the want of uniformity in the concentration of the solution in the cell, the solution on the inner surface of the membrane being more dilute than in the body of the solution owing to the diffusion inwards of the solvent from outside. As the result of his measurements, Kahlenberg concludes that the gas laws do not hold at all for solutions, neither with regard to concentration nor to temperature; and the theory of electrolytic dissociation is also rejected by the author, because he found that solutions of lithium chloride gave lower pressures than solutions of sucrose.

This paper by Kahlenberg was made the subject of discussion by W. C. D. Whetham, and by the Earl of Berkeley and E. G. J. Hartley. The first-mentioned recalled the principles on which the theory of osmotic pressure rests. From the experimental relation between the solubility of a gas and the pressure, Van't Hoff showed that, on the basis of the second law of thermodynamics, the osmotic pressure of a dilute solution must possess the same value as the ordinary pressure of a gas at the same concentration, provided the solution is so dilute that the dissolved systems, each made up of a particle of solute as nucleus,

and the portion of the solvent which it influences, are beyond each other's sphere of action.

No assumption is made as to the nature of osmotic pressure, although Kahlenberg seems to consider that the thermo-dynamic theory of solutions stands or falls with the hypothesis that the pressure is due to molecular bombardment.

The position taken by Kahlenberg, that because a perfect semi-permeable membrane does not exist, a theory which postulates one cannot be maintained, Whetham refuses to adopt. Further, to the statement made by Kahlenberg that the opponents of the Van't Hoff idea have generally held that the so-called osmotic pressure is an ordinary hydrostatic pressure brought about by the entrance of liquid into the osmotic cell, Whetham replies that this is the view which is also held by Van't Hoff and his supporters.

With regard to the brushing aside by Kahlenberg of the theory of ionic dissociation, Whetham remarks that the free existence of the ions (though possibly or probably combined with the solvent) is required by the electrical phenomena, that the theory rests on electrical evidence, and must be tried by such.

In their discussion of Kahlenberg's paper, Lord Berkeley and E. G. J. Hartley point out that the statement made by Kahlenberg, that the indirect measurement of the osmotic pressure from vapour tensions involves the assumption that the gas laws hold for solutions, is contrary to fact. They have shown that aqueous solutions of sucrose give the same value of osmotic pressure whether observed directly or deduced indirectly from the vapour pressures, and the relation connecting osmotic pressure and vapour pressure is quite independent of the gas laws holding for solutions. They also call attention to a typical experiment from which Kahlenberg draws his conclusion against the theory of Van't Hoff—namely, an experiment dealing with the osmotic pressure of sucrose in pyridine.

From Kahlenberg's statement that sugar was found outside the membrane, they calculate that the amount found would correspond with a fall in the pressure gauge of 20 cm. per second, which would account for the fact that the theoretical pressure was not reached. Kahlenberg will not accept the calculation of Lord Berkeley and Hartley, and does not consider that the application of thermo-dynamic reasoning to actual osmotic processes can be applied, because it involves the assumption of a membrane which is semi-permeable, and at the same time passive, whereas his experiments show it to have selective action.

The Behaviour of Liquid Sulphur.—The behaviour of sulphur in the liquid state seems to be abnormal. Several investigations into the matter seem to point to the following explanation of this.

There are two forms of liquid sulphur which are only partially miscible: first, S_l, the pale yellow mobile liquid which is the more stable form up to 160°; and S_m, the brown viscous liquid which is the more stable form above 160°. All liquid sulphur contains both of these modifications up to high temperatures, the quantity of each present depending ultimately on the temperature only, as in ordinary transformations of liquid dynamic isomerides. Up to 160° the equilibrium quantity of S_m is completely dissolved by S_l. At this temperature there are probably two phases—a saturated solution of S_m in S_l and a saturated solution of S_l in S_m. Above 160° only the latter solution is stable, and the amount of S_l present diminishes as the temperature rises. The establishment of the equilibrium $S_l \rightleftharpoons S_m$ is somewhat sluggish in the presence of certain foreign substances—for example, sulphur dioxide, traces of which are always present in ordinary sulphur—so that it is not difficult to obtain superheated or supercooled conditions. In particular, a large proportion of the S_m present in the hot liquid may survive at the ordinary temperature if the liquid is suddenly chilled. It then forms the insoluble, non-crystalline variety known as amorphous sulphur. S_l on cooling always forms crystalline sulphur. The freezing-point of pure S_l is found to be 119·17°. When sulphur is absolutely pure, no amorphous sulphur is obtained on rapidly cooling liquid sulphur from its own boiling-point.

Electrolysis with Alternating Currents.—M. le Blanc has given an account of some electrolytic experiments carried out with alternating currents. The problem to be solved may be stated thus: Copper cannot be deposited from potassium copper cyanide solution by means of a direct current, owing to the absence of cuprion and the stability of the complex cyanide ion containing copper. On the other hand, a copper anode in a solution of potassium cyanide easily dissolves when a current is passed. If, now, two copper electrodes are immersed in a cyanide solution and an alternating current is passed between them, will copper pass into solution? This should depend on whether the copper dissolved at the anode has or has not time to be converted into the complex ion before the reversal of the current. Once the complex ion is formed, the copper contained in it remains permanently in solution. With a current density of 4·6 amperes per sq. dcm. and 4N potassium cyanide, M. le Blanc found that if the rate of reversal was 1,000 per minute the copper passed into solution quantitatively, as if a direct current had been employed, whilst with a rate of 38,000 reversals per minute only 33 per cent. of the theoretical quantity dissolved. From this Le Blanc concludes that in 0·001 minute the reaction between the copper ions and the potassium cyanide is practically complete, whilst with a rate of 38,000 reversals per minute only 33 per cent. of the theoretical quantity dissolved. From this the author concludes that in 0·001 minute the reaction between the copper ions and the potassium cyanide is practically completed, whilst in 0·0000013 minute the action cannot have proceeded to any measurable degree.

By this method Le Blanc hopes to gain information regarding the hitherto unknown rate of ionic reactions. In order to ascertain whether any special action accompanied the employment of an alternating current when no formation of complex ions was possible, Le Blanc studied the action between copper electrodes immersed in copper sulphate solution. With a symmetrical alternating current nothing could be observed. With an unsymmetrical alternating current—that is, one with the periods of alternation such that the current flows for a longer time in one direction than in the other—it was found that the weight of one electrode increased by the same amount as that of the other diminished, quite independently of the rate of alternation, which varied from 3,000 to 15,000 per minute. This behaviour indicates that no action different from that produced by a direct current here takes place.

MATHEMATICS.

(STAGES 2 AND 3.)

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mathematics, etc., Morley College; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

Surds.—Expressions involving surds are of frequent occurrence in both algebra and trigonometry, and the various methods which may be used to simplify such expressions should receive careful attention.

The reader is probably already familiar with some of the easier processes of simplification; thus $\sqrt{18}$ may be written as $\sqrt{9 \times 2} = 3\sqrt{2}$.

Similarly, $\sqrt{72} = 6\sqrt{2}$.

Ex. 1. Find the sum and difference of $\sqrt{72}$ and $\sqrt{18}$.

$$\sqrt{72} + \sqrt{18} = 6\sqrt{2} + 3\sqrt{2} = 9\sqrt{2}.$$
$$\sqrt{72} - \sqrt{18} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2}.$$

A given fractional expression in which a surd occurs in the denominator is simplified by multiplying numerator and denominator by the *complementary surd*.

Ex. 2. Simplify $\frac{6}{2 - \sqrt{3}}$. Given $\sqrt{3} = 1{\cdot}7321$. As $(2 - \sqrt{3})(2 + \sqrt{3}) = 4 - 3 = 1$, it is only necessary to multiply the numerator and denominator of the given fraction by the complementary surd $2 + \sqrt{3}$, then the fraction becomes $6(2 + \sqrt{3}) = 22{\cdot}3926$.

Ex. 3. (*a*) Extract the square root of $15 - 4\sqrt{14}$.

(*b*) Express the quotient of $10\sqrt{6} - 2\sqrt{7}$ divided by $3\sqrt{6} + 2\sqrt{7}$ in its simplest surd form, and find the value of the expression as a decimal correct to four significant figures.

(*c*) Show that $\sqrt{(13 + 3\sqrt{13})} + \sqrt{(13 - 3\sqrt{13})} = \sqrt{(26 + 4\sqrt{13})}$.

N.B. $\sqrt{42} = 6{\cdot}4807$. (1906.)

(*a*) Let $\sqrt{15 - 4\sqrt{14}} = \sqrt{x} - \sqrt{y}$.

Squaring both sides then, we obtain

$$x + y = 15. \quad \ldots \quad \text{(i)}$$
$$2\sqrt{xy} = 4\sqrt{14}, \quad \ldots \quad \text{(ii)}$$
$$\text{or } (x + y)^2 = 225.$$
$$\text{From (ii)} \quad 4xy = 224.$$
$$\text{Subtracting } (x - y)^2 = 1$$
$$\text{Hence } x + y = 15$$
$$x - y = 1.$$
$$\therefore 2x = 16 \text{ or } x = 8$$
$$2y = 14 \text{ or } y = 7.$$

Hence $\sqrt{15 - 4\sqrt{14}} = \sqrt{8} - \sqrt{7}$ or $2\sqrt{2} - \sqrt{7}$.

(*b*) $\dfrac{10\sqrt{6}-2\sqrt{7}}{3\sqrt{6}+2\sqrt{7}}$. Multiplying numerator and denominator by $3\sqrt{6}-2\sqrt{7}$, this becomes

$$\frac{(10\sqrt{6}-2\sqrt{7})(3\sqrt{6}-2\sqrt{7})}{54-28}=\frac{208-26\sqrt{42}}{26}=1{\cdot}519.$$

(*c*) Let $\sqrt{(26+4\sqrt{13})}=\sqrt{x}+\sqrt{y}$.

Squaring both sides

$$26+4\sqrt{13}=x+y+2\sqrt{xy}.$$

$$\therefore x+y=26. \quad \ldots\ldots\ldots \text{(i)}$$

$$2\sqrt{xy}=4\sqrt{13}. \quad \ldots\ldots\ldots \text{(ii)}$$

Squaring both sides of (i), then we obtain

$$(x+y)^2=676,$$

and from (ii) $4xy=208$.

Subtracting $(x-y)^2=468=36\times 13$.

Hence $x+y=26$

$$x-y=6\sqrt{13}$$

$$2x=26+6\sqrt{13},\ \therefore x=13+3\sqrt{13}$$

$$2y=26-6\sqrt{13},\ \therefore y=13-3\sqrt{13}.$$

Hence $\sqrt{(26+4\sqrt{13})}=\sqrt{(13+3\sqrt{13})}+\sqrt{(13-3\sqrt{13})}$.

Equations.—The section of the subject dealing with equations is somewhat extensive in its various applications, including not only simple or linear equations in one, two, or more unknown quantities, but also quadratic and simultaneous quadratic equations.

When an equation occurs of higher degree than the second, it is usually possible either to express the equation in terms of its factors, and thus obtain the roots required, or to repeat the process for the solution of a quadratic equation. It would be difficult, if not impossible, to give any law or rule which would apply to more than a comparative few of the equations which are likely to be met with. It is only after a student becomes acquainted with several typical examples that he is able to proceed to solve a given equation with some degree of certainty.

It may be pointed out at this stage that clear ideas as to what is meant by an equation and its roots can be obtained by plotting a few equations on squared paper. Thus a straight line can be drawn through the plotted points in a simple equation, and a curve when the equation is of the second or higher degree. Such a line or curve not only indicates clearly the relations between the variables and the constants, but, in addition, the values of x satisfying such an equation are found at the point or points where the line or curve crosses the axis of x.

Ex. 4. Solve the following equations:—

(*a*) $\quad x+\dfrac{1}{x-3}=\dfrac{41}{5}$.

(*b*) $\quad x^2-2(b+c)\,x+b(b+2c)=0$.

(*c*) $\quad bx+\dfrac{a}{y}=2b,\ \dfrac{a}{x}+by=3a.$ (1906).

(*a*) Multiplying both sides by $x-3$, then we obtain

$$x(x-3)+1=\frac{41}{5}(x-3).$$

Multiplying by 5

$$5x^2-15x+5=41x-123.$$

$$\therefore 5x^2-56x=-128.$$

$$x^2-\frac{56}{5}x+\left(\frac{28}{5}\right)^2=-\frac{128}{5}+\frac{784}{25}=\frac{144}{25}.$$

$$\therefore x=\frac{28}{5}\pm\frac{12}{5}=8 \text{ or } \frac{16}{5}.$$

(*b*) $\quad x^2-2(b+c)\,x+b\,(b+2c)=0,$

or $x^2-2(b+c)\,x+(b+c)^2=-b(b+2c)+(b+c)^2=c^2$.

$$\therefore x=(b+c)\pm c=b+2c \text{ or } b.$$

(*c*) $$bx+\frac{a}{y}=2b. \quad \ldots\ldots\ldots \text{(i)}$$

$$\frac{a}{x}+by=3a. \quad \ldots\ldots\ldots \text{(ii)}$$

Multiplying (i) by y and (ii) by x, then

$$bxy+a=2by$$

$$bxy+a=3ax$$

Subtracting $\quad 2by=3ax$

$$\therefore y=\frac{3a}{2b}x \quad \ldots\ldots\ldots \text{(iii)}$$

Substituting this value in (i), then

$$bx+a\times\frac{2b}{3ax}=2b,$$

$$\text{or } bx^2+\frac{2}{3}b=2bx$$

$$x^2-2x=-\frac{2}{3}$$

$$x^2-2x+(1)^2=1-\frac{2}{3}=\frac{1}{3}.$$

$$\therefore x=1\pm\frac{1}{\sqrt{3}}=\frac{3\pm\sqrt{3}}{3}.$$

Substituting this value in (iii)

$$y=\frac{3a}{2b}\left(\frac{3\pm\sqrt{3}}{3}\right)=\frac{a}{2b}(3\pm\sqrt{3}).$$

Ex. 5. Solve the equation $x^2-px+q=0$, and show from your solution that the sum of the roots is p and their product q. (1903)

$$x^2-px=-q$$

$$x^2-px+\left(\frac{p}{2}\right)^2=\frac{p^2}{4}-q=\frac{p^2-4q}{4}.$$

$$\therefore x=\frac{p\pm\sqrt{(p^2-4q)}}{2}.$$

Hence the roots are $\frac{1}{2}\{p+\sqrt{(p^2-4q)}\}$,

or $\frac{1}{2}\{p-\sqrt{(p^2-4q)}\}$.

The sum is $\dfrac{2p}{2}=p$.

Product is $\frac{1}{4}\{p^2-(p^2-4q)\}=q$.

Ex. 6. Form the quadratic equation whose roots are

$$3+\sqrt{2} \text{ and } 3-\sqrt{2}. \quad (1898.)$$

The required equation is

$$(x-3-\sqrt{2})(x-3+\sqrt{2})=0, \text{ or } x^2-6x+7=0.$$

The result obtained may be verified by solving the quadratic equation $x^2-6x+7=0$.

Ex. 7. (*a*) Show that the expression $12x^3+25x^2-31x+6$ vanishes when $x=\frac{1}{4}$, and when $x=-3$. Hence find its factors.

(*b*) Solve the equation $x^4-4x^2+1=0$.

Expressing the four values of x (i) in their simplest surd form (ii) as decimals correct to four places, having given

$$\sqrt{2}=1{\cdot}41421,\ \sqrt{6}=2{\cdot}44949. \quad (1907.)$$

Ans. (*a*) $(x+3)\,(x-\frac{2}{3})\,(x-\frac{1}{4})$.

Ex. 8. (*a*) Find the condition that the roots of the equation $x^2+px+q=0$ are imaginary, and show that the roots of $x^2+2(a+b)x+2(a^2+b^2)=0$ are imaginary.

(*b*) Show that the roots of

$$\frac{1}{x-1}+\frac{2}{x-2}+\frac{3}{x-3}=0 \text{ are real and unequal.}$$

(*c*) Show that the greatest value which the expression $1+7x-3x^2$ can have for real values of x is $5\frac{1}{12}$. (1907.)

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PREPARATORY MATHEMATICS.

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Our Modern Language Section.

THE PHONOGRAPH AS AN AID TO MODERN LANGUAGE TEACHING.

BY S. A. RICHARDS, B.A.

APPARATUS of all kinds is in great favour just now in the educational world. It is considered impossible to teach geography properly without the aid of sextants, orreries, and models of all kinds: we are no longer content to give our young geometricians the definitions of plane and solid figures; they must be provided with neat little models of cylinders, cones, and what not.

To what extent the use of apparatus is advisable is matter for discussion. There are some who hold that it is possible to make things too easy, and that it does no harm to give the imagination a little hard work. I cannot enter into that question here. I wish to discuss the possibilities of one piece of apparatus only—the phonograph. It is only natural that the eager educationist should keep his eyes open, and see whether he cannot press each new invention into his service as it comes along.

In the case of modern languages we have got to look upon pictures, songs, etc., as natural adjuncts to the teaching. If they do nothing else—and perhaps some of us expected too much of them at first—they help to stimulate interest, and that is a boon by no means to be despised. It is not likely, then, that the phonograph (or gramophone) should escape notice long. I have experimented with it in class, and certainly think it has its uses: an account of my experiences may perhaps be of interest to other teachers who have not yet included it among their educational paraphernalia.

The experienced teacher will not be tempted to overrate the capability of a talking machine as a teacher of language. It can, of course, never supersede the living teacher. If you have visions of enjoying a well-earned rest by turning on the phonograph, and leaving it to take your place, I advise you to dispel them with the least possible delay. It is true that you can now obtain a complete French course in the form of phonographic cylinders, so that your pupils can listen to a set of lessons reeled off by your machine with mechanical precision, and reproducing, more or less accurately, the voice and pronunciation of the "educated Frenchman" who originally spoke them into the recording trumpet. But you need not be reminded that not all your pupils are sufficiently keen or intelligent to make sound progress in their language study by their listening.

The phonograph, unfortunately, does not stop to call the idler to attention, to shower questions upon the inattentive, to explain things that have not been understood. Again, as has been so repeatedly pointed out by those who have tried and who know, mere imitation is of comparatively little avail for the purpose of acquiring a correct pronunciation. Let a boy hear the clearest of phonographs reel off in the most irreproachable manner such words as *vu*, *eux*, *leur*—to take front-rounded vowels as an example—no matter how many times, yet experience teaches us that he will still fail to get the required sounds correctly. He must be shown how these sounds are produced; the tongue and lip positions must be explained and illustrated; he must be led up to them by graduated phonetic exercises. This is the quickest—indeed, the only—way.

To the private student who is attempting to learn a modern language entirely by himself, such a course of lessons would be of some use—that is to say, it might render his task a little less hopeless. Imitation of the correct pronunciation will do something for an earnest student if he tries hard enough; and if he cannot get this correct pronunciation from a living voice, the next best thing is a talking machine. The Linguaphone Company make a speciality of such sets of phonographic lessons. They will certainly prove interesting and useful to the teacher at any rate. If imitation alone is of little use, yet the teacher with the trained ear and a sound knowledge of phonetics can always profit by listening to the language in which he is interested correctly pronounced, and enunciated by an educated native. His knowledge enables him to detect small differences and *nuances*, and to interpret them rightly. He not only recognises that one sound is slightly different from another, but he knows in what that difference consists—as, for example, that one is more open than the other, or produced farther back, and so on. In the case of one who does not possess the knowledge necessary for this interpretation, mere listening is almost labour wasted as far as pronunciation goes. Of intonation and elocution I shall have something to say later on.

To the teacher, then, for his private use, the phonograph will afford amusement, and will also be of real assistance. It will not take the place of visits to France or conversation with a French friend; but if he cannot avail himself of these aids, the phonograph will go some way toward supplying the deficiency. Indeed, in some respects it will serve a purpose which the other two means will not. The great advantage is the possibility of repetition. One can listen to the same piece over and over again, until the points to be specially noticed have been thoroughly driven home. Moreover, the "personal equation" has not to be reckoned with. Your phonograph will reel you off a poem or a speech a dozen times without the slightest variation; not only the pronunciation but the intonation, the amount of expression, the intensity of sound, will not vary. This is a great advantage when we are studying some particular point. The human elocutionist, however willing he may be, could scarcely stand a dozen repetitions without becoming weary, and no two of these would be exactly alike. Suppose we have a speech or a recitation by such a man as Coquelin or Sylvain; we cannot fail to learn much with regard to accent, intonation, etc., by hearing this repeatedly. We can, moreover, stop the machine at any point and hear a line again if we are not certain of a particular sound, with perfect assurance that it will be produced in exactly the same manner as before. This relentless absence of variation on the part of the phonograph—though perhaps a little trying to the nerves, and subject to adverse criticism from an artistic point of view—constitutes

its chief value for the student. It is possible—easy, indeed—thus to learn a poem, and insensibly to acquire the accent and intonation of the speaker. This is a great gain. To be able to recite, for example, *Le Chêne et le Roseau* after the manner of Sylvain—even a considerable way after—is to have mastered a good deal in the way of diction. Apart from the pleasure of astonishing your friends by your elocutionary powers in the matter of reciting French poetry, the acquisition you have made will prove a valuable possession, and will not fail to render it easier in future, when learning fresh pieces, to get something like the correct accent and intonation. It is astonishing how easy it is to learn by heart from the phonograph. In addition to this, the practice, of course, forms a good training for the ear. People's powers of hearing correctly vary very much. I have known many persons whose facility in speaking French was very slight indeed, who yet had no difficulty in understanding what French people said even when they were excited! With others the reverse is the case. They speak fluently, but find great difficulty in getting the ear accustomed to the sounds of the language sufficiently to discriminate them easily. To such the phonograph is certainly useful. By repeating a selection several times you will be easily conscious of the progress you are making. The first repetition may perhaps seem nothing but a blur. The second time you will distinguish a word here and there. Gradually, by dint of frequent repetitions, you will master the whole piece until every syllable seems perfectly distinct, and you begin to wonder why you ever had any difficulty in following it.

(*To be continued.*)

FRENCH PRIZE COMPETITION.

RULES.

1. All translations should be **posted not later than October 8, 1907,** and addressed:—PRIZE EDITOR, Office of *The Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

Paris, selon ses quartiers, paraissait vide, tout labeur suspendu, toute vie éteinte, ou bruyant d'une animation fiévreuse. C'étaient des rues entières sans un passant, vitrines sans étalages, trottoirs où picoraient des poules. Le petit commerce végétait. Les bourgeois, tapis derrière leurs fenêtres closes, tremblaient de peur, à l'idée d'entendre résonner sur les paliers les crosses des réquisitions, retentir la voix des gardes avinés à la chasse des réfractaires, tremblaient de joie à l'idée d'entendre bientôt, au tournant des rues, le chant libérateur des clairons de Versailles. Les boulevards s'allongeaient interminables, presque sans voitures, ou bien c'étaient des grouillements populaires, le tapage de la foire au pain d'épices sur la place de la Bastille, cinq mille personnes réunies au cirque Napoléon pour l'alliance des départements, une foule endimanchée se rendant au concert des Tuileries. Tandis que dans les convulsions finales, dans le désarroi, l'appréhension, l'attente farouche, s'agitaient ses maîtres impuissants, débordés, submergés par les mille vagues en tumulte de l'anarchie, le peuple de Paris vivait insouciamment ses dernières heures, sans se douter de l'armée aux portes. Comme si l'éternelle cannonade n'était plus qu'un accompagnement de musique qui devait durer toujours, il jouissait de sa liberté, ivre de force et de lumière. Dans une flambée suprême, où brûlait aussi l'alcool des tonneaux défoncés, bus à même, le chaud soleil de mai éblouissait, versant la frénésie de vivre. Le printemps complice enguirlandait de ses feuillages verts, embaumait de son odeur grisante ces jours de mort. La nature sereine poursuivait son grand-œuvre, entraînait dans son flux souverain, son orbe éternel, tous ces êtres avides d'oublier, d'aimer, ces éphémères.

From "La Commune," by PAUL *and* VICTOR MARGUERITTE.

RESULT OF THE AUGUST AND SEPTEMBER COMPETITION.

The prize is awarded to "Gog." (Will "Gog" kindly forward name and address for publication?)

First Class.—E. M. Clough, Shakspere, Winnowsty, Leander, Punch, K. S., Mic, Jasmine, L., M. E. W., Dr. Dee, Ternan, Tortoise, Tŷ Du Jay, Ausum, Kettering, Oiseau, T. V. D., Tabby, Caudebec, Janet, Sunny, Balinard, Balnagask, Meithrinva, Syd, M. des A., Gegegish, Rowena, Gladiator, Peg, Brunswick, Æneas, Gable-endy, C. D. Early, J. W. W., Sanscrit, Alaric, Tinea, Florentia, Yllop, Peggotty, La jeune fille, Une aspirante, Toorie, Grateful, Basso profundo.

Second Class.—Nautilus, L. A. C., Excelsior, Vic, Wallace Ellison, Great Bridge, Gabitas, Anne, Mimosé, Erin, Albion, Binkie, E. J. G., Marah, Buon, Cylax, L. Adams, J. F. MacKellar.

Report.

The piece set was of a more straightforward and simple character than many we have given. *Viennent d'enlever* was an idiomatic expression which some failed to recognise; and about half a dozen followed strictly some dictionary meaning for *magister* by translating it "*country* schoolmaster." Quite a number translated *enfin* as "finally," or "at last." It is a sort of resuming word, equalling "to sum up," "in a word," or some like English phrase. Several complained they could not find *papotages* in the dictionary. It is certainly a neologism, but not of very recent date. It is given in the *Dictionnaire général de la langue française*, by Hatzfeld, Darmesteter, and Thomas. This dictionary was published about a dozen years ago. *Papoter* is equivalent to *bavarder*. Two competitors complain we have published the same extract in two successive months. Owing probably to the holidays, few papers were sent in in August. The papers sent in during August and September have been examined together, and one prize given for them. We will deal with "Caudebec's" letter next time.

Prize Translation.

The Guildhall trumpets sound a réveillé, to which the fanfares of Westminster, the drums and fifes of the Tower, make response. The warders of the palaces by the river-side join in the concert, each ringing a different peal, whilst the chimes of Lambeth vie with those of Westminster, and St. Paul's supplies the bass in the grand concerto of the bells. With this confused murmur are mingled the horn-blasts of the gate-keepers, and the keeper on duty at Ludgate blows a different blast from those in charge at Newgate, Cripplegate, Moorgate, or the entrance to Queen's Bridge. It is a succession of notes, or only three notes, or only one; sometimes a trill. The most characteristic blast is the slaughter-house one, blown by the overseer, and suggestive of a long-drawn wail, the parting groan of some dying animal. Then are heard the whistles of the night watchmen, who have just removed the chains barring the streets, for at night there is no carriage traffic; the clatter caused by the market men clashing together two boards of oak, to announce that business has begun; the milkmen's bells, that wake up the maid-servants; the schoolmasters' gongs, calling the scholars together—in short, the huge yawn of a city roused from its sleep: the tattle of gossips, men's oaths, the shouts of children, the rumble of vehicles, the songs of boatmen, the echoes of the forge, the factory, and the barracks.

"GOG."

OUR TUTORIAL SECTION

OUR CERTIFICATE COURSE FOR 1907.

BY GEORGE COLLAR, B.A., B.SC.,
Head-Master of Battersea Pupil-Teacher School.

Test Questions on Last Month's Work.

THEORY OF TEACHING.

1. Give a few rules by which you would be guided in your choice of physical exercises for children of different ages.
2. Explain clearly what is meant by "force of habit," and say what steps you would take in training scholars in good habits.

ENGLISH LITERATURE.

1. Write a short account of the plot of *Macbeth*, and discuss the leading characters in it.
2. *Macbeth* has been called "the most purely tragic of all Shakespeare's plays." Compare it in this respect with *Hamlet* or any others with which you are familiar.
3. Do you regard the witches as "human" or "superhuman"? What is the most similar character in any of Shakespeare's other plays? What are the limits of their supernatural power, and how are these shown in the scene with Macbeth and Banquo?
4. Explain the following words and phrases—*Orcus and Ades, Anarch, Confusion worse confounded, Argo, Ulysses on the larboard shunned Charybdis.*

ENGLISH HISTORY.

1. Give an outline of the development of the French Revolution under the *Convention*.
2. Write an account of the maritime struggle between France and England from "the glorious First of June" to the Treaty of Amiens.

GEOGRAPHY.

1. Compare the rivers of North America which run north with those that run south.
2. Write a full account of the inhabitants of the United States under the following heads—(*a*) Indian tribes, (*b*) Early Colonists from Europe, (*c*) Negroes, (*d*) Chinese, (*e*) Recent Immigrants from Europe.

ARITHMETIC.

1. A rectangular piece of paper is measured in inches and in centimetres, with the following results: Length, 8·73 inches, or 22·17 cm.; breadth, 5·57 inches, or 14·15 cm.

Find the area of the paper in square inches and in square centimetres, and hence find the number of square centimetres in a square inch. If the given measurements are correct to the nearest figure in the second place of decimals, to how many places may your results be regarded as accurate?

2. A man has part of his money invested at 3½ per cent. and part at 2½ per cent. He sells out half of each, and reinvests the proceeds at 6 per cent. If his original and final incomes are £469 and £684, 10s. respectively, find his total capital and the amounts of his original investments.

ALGEBRA.

1. Solve the equations:—

$$x + y + z = 1.$$
$$ax + by + cz = 0$$
$$a^2x + b^2y + c^2z = 0.$$

2. If the perimeter of a rectangular park is 7,920 yards and its area is 720 acres, what are the lengths of its sides?

GEOMETRY.

1. A and B are two points 3 inches apart. The point P moves so that the angle APB is always 60 degrees. What is the locus of P? Construct it, and prove that P can never be less than 1·5 inches from the middle point of AB.

2. In a circle 2·7 inches in radius chords are drawn through a point which is 0·7 inch from the centre. What is the area of the rectangle contained by the segments of one of these chords?

ELEMENTARY SCIENCE.

1. Describe the chemical composition and physical forms of the different minerals consisting of silica and of limestone. How has clay been formed?
2. What are the characteristics of sandstone, coal, and slate?

Notes and Syllabus for October.

ENGLISH COMPOSITION.

Last month exercises were given in criticising and correcting faulty sentences. But the student should aim at something higher than the avoidance of gross errors in his composition; he must critically examine pieces of the highest order of prose and try to discover wherein their excellence lies. He will then be able, on suitable occasions, to employ the same methods to give a finish to his own writings, taking care at the same time not to overdo it and fall into an affected style of writing. For this purpose he should take chapters from the prose works set for general reading and mark passages that strike him by their force or their beauty, and note how this force or beauty is obtained.

In the first place, it will be seen that the highest form of composition is that which expresses noble thoughts and deals with worthy subjects. You cannot write high-class prose or poetry to describe a drunken brawl or an unworthy act. The use of high terms in describing low acts is known as *bathos*, and must be avoided. This is frequently brought about by the use of the same term, or of two corresponding terms, in the same sentence, in one case literally and in the other figuratively—for example, Robert Boyle was the father of philosophy and brother-in-law of the Earl of Cork.

Criticise the following sentences:—

1. Straws swim on the surface, but pearls lie at the bottom.
2. I come to bury Cæsar, not to praise him.
3. It is the bright day that brings forth the adder and that craves wary walking.
4. What light is shed upon the world at this day from amid those rugged palaces of Florence?
5. When the spirits are languid and weary, do we like to think how bright they were in other days, the hope how buoyant, the sympathies how ready, the enjoyment of life how keen and eager? So they fall—the buds of prime, the roses of beauty, the florid harvests of summer—fall and wither, and the naked branches shiver in the winter.

Write essays on the following subjects:—

1. A proverb is the wisdom of many and the wit of one.
2. Kind hearts are more than coronets,
   And simple faith than Norman blood.
3. 'Tis not in mortals to command success; but we'll do more, for we'll deserve it.

ENGLISH LITERATURE.

For general reading continue to work at the anthology, and read Shakespeare's *Hamlet*.

Revise in detail the first book of *Paradise Lost*, and pay special attention to the following notes:—

1. *The Versification.*—The poem is written in what is known as "blank verse"—that is, without rhyme—in lines containing ten syllables, the alternate ones of which are accentuated. The earliest English poetry had no rhyme; but as it depended upon alliteration, it is not generally described as blank verse, and so the first English writer who employed true blank verse was the Earl of Surrey, who used it in translating the second and fourth books of Virgil's *Æneid*. Nicholas Grimald's two poems, on *The Death of Zoroas* and *The Death of Cicero*, published in Tottel's *Miscellany*, are the earliest pieces of original English blank verse. In 1574 Gascoigne wrote a satire called *The Steel Glass* in blank verse. Marlowe adopted blank verse in writing the tragedy of *Tamburlaine*, and it became the general metre employed by dramatists. Milton therefore excluded these when

he claimed that *Paradise Lost* was an "example set, the first in English, of ancient liberty recovered to *heroic* poem from the troublesome and modern bondage of rhyming." But it is hard to see how he could exclude Surrey's work, unless he refused to acknowledge it because it was not original. Milton himself had already written *Comus* in blank verse. Occasionally a weak ending—that is, a line ending with an unaccented syllable—is used for the sake of a little variety.

"Free and | to none | account | able | prefer | ring."—II. 255.

This example also supplies an example of the use of a trochee in the first foot instead of an iambus. This is a very frequent way of introducing variety, and so is the introduction of a three-syllable foot.

Blank verse demands that there should be a natural pause at the end of each line, and this should, of course, never come in the middle of a word nor between an adjective and the noun it qualifies. The first produces an effect so ludicrous that it is never found except in the comic poets. The second obscures the end of the line; but still Milton employs it.

> "Which when Beëlzebub perceived, than whom,
> Satan except, none higher sat, with grave
> Aspect he rose, and in his rising seemed
> A pillar of state."—II. 299–302.

It is probable that Milton even employed it on purpose to secure "true musical delight, which," he says, "consists only in apt numbers, fit quantity of syllables, *and the sense variously drawn out from one verse into another.*"

2. *The Style.*—Of this Professor Stopford Brooke says: "The style is always great. On the whole, it is the greatest in the whole range of English poetry; so great that when once we have come to know and honour and love it, it so subdues the judgment that the judgment can with difficulty do its work with temperance. It lifts the low, gives life to the commonplace, dignifies even the vulgar, and makes us endure that which is heavy and dull. We catch ourselves admiring things not altogether worthy of admiration, because the robe they wear is so royal. No style, when one has lived in it, is so spacious and so majestic a place to walk in." At the same time we must say that the reason that so few people have read *Paradise Lost* right through is because the style is not attractive to the beginner. The long, involved sentences, the inverted and elliptical expressions, and the frequent idioms borrowed from Latin and Hebrew, are even repulsive to one who has not made up his mind to study the poem and to devote a good deal of hard work to it; and it is not till after one has "lived in" the style for a considerable time that it becomes a spacious and majestic place to walk in.

3. *The Topography.*—The reader will remember that in Milton's Italian journey the poet met and conversed with the great astronomer Galileo. There are several allusions to this in the poem: for example,—

> "The moon, whose orb
> Through optic glass the Tuscan artist views
> At evening from the top of Fesole."—I. 287–289.

In Milton's days there were strongly conflicting views as to the arrangement of the solar system and its relation to the other parts of the universe; and although Milton probably accepted the more enlightened view which is now held, yet for the purpose of the poem he found it more artistic to follow the Ptolemaic theory that the earth was the centre of the system. According to Milton the universe consisted originally of two parts—Heaven, or the empyrean; and Chaos, or the abode of confusion. The first was the abode of order and pure delight, of freedom and happiness. God was omnipresent there, but the highest central portion was regarded as His seat by the celestial beings who desired to adore Him. The inhabitants of the celestial regions, Cherubim and Seraphim, in their orders are described in the text. A crystal wall or floor divided Heaven from Chaos, an infinite quagmire of confusion.

The student should read the account of the war in Heaven (given in Book V., line 560 to the end, and in Book VI.), as the result of which Satan and the rebel angels were cast out of Heaven and

> "Nine times the space that measures day and night
> To mortal men, he, with his horrid crew,
> Lay vanquished, rolling in the fiery gulf,
> Confounded though immortal.....
> Such place Eternal Justice had prepared
> For those rebellious."

This new region was called Hell, and was situated right in the lowest regions of Chaos. In the middle of it was the abyss of fire, with the four rivers Acheron, Phlegeton, Styx, and Cocytus running into it. The surrounding parts are graphically described in the account of Satan's journey given in the last part of the second book.

Lastly, we read in the seventh book how the Divine Son passes forth into Chaos, and with his golden compasses strikes out the sphere which constitutes the universe as perceived by man. This sphere has the earth as its centre, and revolving round it are the planets, sun, and stars innumerable. At its uppermost

point this sphere touched the floor of Heaven and hung suspended in Chaos. Right down below it, but separated by a great portion of Chaos, lay Hell.

The world was conceived to consist of ten concentric spheres, which revolved in a very complex manner. A knowledge of the above imaginary arrangement is necessary not only for the understanding of *Paradise Lost*, but also of a great many allusions in English literature.

School Management.

Study the relation of the child to the work he is called upon to do in school—conditions of attention, training in good habits.

The objects that surround us force themselves in some degree upon our mind whether we will or not. Hence it is first necessary to consider the admission of these things to our consciousness without any voluntary effort. This is frequently called non-voluntary attention, though others would say that it is not attention at all. A person may spend half an hour in the drawing-room of a friend he is visiting, but at the end be quite unable to describe the position of the articles of furniture, or even to say whether the room contained a particular article or not. Some features of the room would, however, be so marked that he could not help noticing them; that is, they would have forced themselves upon his consciousness, either by their quality or quantity—as bright red paper hangings, the absence of a carpet, or by a variation—as, for instance, if a picture fell from its place while he was in the room. The teacher often has to deal with this involuntary attention, and sometimes it causes great difficulty. A child may be sitting in "apple-pie order," with his eyes fixed on his teacher, and the teacher's words force themselves upon the child's consciousness to such an extent that if suddenly called upon for the last word he would be able to say it, and could probably repeat the last statement; but a later test would show that all the lesson had made no impression, because the child's attention had not been fixed by his will upon what he was being told. There has been nothing to put his mind into relation with the matter—in other words, there has been no *interest*. The teacher must therefore aim at exciting *interest*. This may be obtained in a variety of ways. Fortunately there is inborn in all of us a craving for knowledge which is called *curiosity*, and this is especially strong in young children. This leads them naturally to ask questions, some of which may give trouble to parents and teachers, who frequently on that account try to stifle the feeling of curiosity in their children. But this is a great mistake; the instinct should be fostered and directed, not suppressed. Other things being equal, the most curious child is the best pupil. His natural curiosity gives him an interest in the work which secures his voluntary attention. The teacher may stimulate curiosity, but he cannot create it. In other ways, however, he can gain the pupil's interest. If he presents work that is wholly unfamiliar he cannot secure the attention. The mistake is often made of presenting a map to a child without any previous preparation. The child may endeavour to fix his mind on it, but in the matter of real attention his efforts end in failure. The interest in a new object depends upon its relation to a familiar one. The child can be taught to understand the plan of a room because he is familiar with the room; then he can understand the map of the school district, and afterwards the map of a country; and in this way his interest in a map can be secured. The third source of interest is the pleasure, or pain, connected with the subject. Experimental lessons invariably arouse interest, because the child feels pleasure in seeing bright

or moving objects. The pleasure may be connected with the attention, although not arising directly from it. The rewards and punishments bestowed on good or bad work are pleasures and pains that induce the child to attend to his lessons; but as they are indirect, their effect is not so marked as that of the direct interest aroused by the nature of the subject itself. But still the fact that the fear of the rod has some connection in the child's mind with the direction of his attention explains the results obtained by teachers in bygone days whose method consisted of "flogging it in."

The three main factors in voluntary attention are the physical and mental condition of the child, his preparedness for the particular work, and the strength of the stimulus by which he is excited. It may be that in some cases those who plead for the provision of meals in school are actuated by political or other motives, but certainly they have a very sound argument to support their case, for no child can fix proper attention on a lesson while he is suffering from the pangs of hunger; and from what we have said about the relation between new objects and familiar ones, it follows that attention is best secured by recalling to the child's mind those things related to the new matter with which he is already familiar. When we speak of the strength of the stimulus, we mean, of course, the relative strength. Thus we may hear two teachers give an order in tones of equal loudness; but if one habitually shouts, while the other is accustomed to speak in a low tone, the order of the latter will excite the attention of the pupils more forcibly than that of the former. Another condition is the absence of distracting stimuli. How difficult it is for young children to keep their attention on the work while the window is being opened or the gas lit! Street cries, a passing band, a noise in the next room, all act as stimuli which compete with the one the teacher is employing in his endeavour to secure the child's attention. Indirectly the faulty heating and ventilating arrangements of the room destroy the attention; for if a child's fingers are numbed with cold, or if the impurity of the air has led to a lack of energy, it is impossible for him to give satisfactory attention. Continued bodily constraint acts in just the same manner. A child's attention always flags if he is kept too long in one position.

The power of attention may be cultivated until it becomes a habit, just as any other act that at first requires definite will action.

As we have only one brain, so also it is impossible to direct attention to more than one object at a time. There are apparently some exceptions; but these are only apparent, and are due in some cases to the quickness with which the mind can flit from one object to another. This is the case with an accomplished chess player, who can play two or three games at once, sometimes even blindfold. Julius Cæsar is said to have been able to write one letter and dictate four others at the same time. In other cases two or more actions can be regarded by the mind as one compound act. Thus with a little practice one hand may carry on an up-and-down motion while the other carries on a motion from side to side; but to the mind this is one act, for there is no need to think of the two separately. Let the student, however, take a blackboard, and with the right hand draw an equilateral triangle and with the left a circle. Separately, these may be drawn quickly and fairly correctly, but the attempt to do the two at once proves that it is impossible to fix the attention on a circle and a triangle at the same time. If the idea of the circle is uppermost, both hands draw a curve; but if the idea of the triangle is strongest, both figures approximate to a triangle.

English History.

Continue the history to the accession of Queen Victoria, and revise the early part to the accession of Henry the Second.

Geography.

Revise the geography of the British Isles, paying special attention to the relation between causes and effect. For instance, study the positions of the industries and towns in connection with the productions and means of communication; trace the connection between railways (and roads) and the river valleys and passes over ranges of hills. The position of ports should be noted in connection with the countries from which they import goods and with the centres of industry from which goods are exported.

Arithmetic.

Revise the theory and work all examples in the Miscellaneous Exercises 1–300 which seem to present any difficulties. If the difficulties are real and you cannot overcome them, send them up for help.

Algebra.

Study the chapter on permutations and combinations. These afford considerable exercise for clear reasoning, without which fallacies are easily committed. Every example should be worked.

Geometry.

The following problems are important, and we will here try to show how algebra may be utilised in working out a geometrical problem.

1. To divide a straight line in extreme and mean ratio—that is, to divide a line in two parts such that the less may be to the greater as the greater is to the whole line.

Algebraical solution.—Let a denote the length of the given line and x the length of the greater part, then the length of the other is $a - x$.

These must be in the following proportion:—

$$a - x : x :: x : a;$$

$$\text{that is, } a^2 - ax = x^2.$$

$$\therefore x^2 + ax = a^2.$$

$$\text{(Completing the square), } x^2 + ax + \frac{a^2}{4} = \frac{5a^2}{4};$$

$$\text{that is, } \left(x + \frac{a}{2}\right)^2 = \frac{5a^2}{4}.$$

Now it is easy to find the quantity represented by the right-hand side, for if we construct a right-angled triangle whose sides are respectively equal to a and $\frac{a}{2}$, it follows from I. 47 that the square on the hypotenuse will be $\frac{5a^2}{4}$. And from the last equation we know that the hypotenuse itself is equal to $x + \frac{a}{2}$; consequently, by deducting half the given line from this, the required part can be found. Euclid's construction is just a neat method of working this out.

In a similar manner a point may be found which divides the line externally in extreme and mean ratio.

2. To divide a straight line externally or internally into two parts, so that the rectangle contained by the two parts is equal to a given square.

Note that for the internal division the solution is not possible when the given square is greater than the square on half the given line.

3. To divide a given straight line into two parts, so that the square on one part shall be double of the square on the other.

4. To divide a given line into two parts, so that the sum of the squares on them shall be equal to a given square.

Euler's theorem.—If A, B, C, and D are any four points in a straight line taken in order, the sum of the rectangles AB . CD and BC . AD is equal to the rectangle AC . BD.

Elementary Science.

Last month we gave a few notes on the crust of the earth, showing the materials of which it is composed. Now, the rocks which constitute the earth's crust are divided into two great classes—igneous rocks, so called because they show evidence of having been deposited in the molten state, and aqueous or stratified rocks, so called because they are arranged in beds or strata, evidently by the action of water. In the igneous rocks there are no traces of life or of anything that has been alive. Evidently the temperature of the earth at the time those rocks were deposited was too high for any living thing to exist. But when we come to study the stratified rocks we find fairly abundant remains of the creatures which inhabited the earth at the time the strata were deposited, and whose dead bodies were sealed up in the material which formed these stratified rocks. In general, we can tell the age of rocks by the order in which they have been deposited, for the oldest must necessarily be at the bottom; consequently fossils found in the lower rocks are older than those found in the upper. By a study of the fossils we find that there has been a gradual evolution of life on the earth—the more recent forms are more highly organised than the more ancient. Hence rocks and fossils mutually aid us in the study of them. The oldest rocks are known as the "Palæozoic rocks," or rocks of ancient life, and the oldest trace of life on this earth is found in some rocks in the basin of the St. Lawrence—hence called the Laurentian series. Some dispute whether it is really a fossil or not, but the general opinion is that it is a fossil, and it is called the Eozoon, which means the dawn of life. The next is a kind of coral found in some of the Cambrian series, or rocks forming the mountains of Wales; and a little higher up we find some shells of the Obolella, a creature belonging to a class of shellfish—the Terebratula—afterwards very widely distributed. Up to this point signs of life are rare, but then we reach the upper Cambrian rocks, and find quite an outburst of Trilobites—

creatures which are allied to modern crabs and lobsters. There are also numerous fossil sponges and Encrinites, the latter being related to the modern starfishes and sea-urchins. So abundant have some trilobites been that whole beds of Silurian rocks are chiefly composed of their remains. From the Silurian beds we can also find remains of a kind of cuttle-fish, and in the later Silurian series there existed a species of shark. This fish, and others that existed about that time, had a tail consisting of two unequal lobes. • Fishes whose tails consist of two equal lobes, like the salmon or herring, are comparatively very modern, and are not found below the Oolitic limestone rocks.

In the Devonian beds Hugh Miller discovered the extraordinary winged fish or Pterichthys. For a long time it was thought that there were no traces of vegetable remains before the end of the Devonian age, except a few traces of seaweeds, but the existence of magnificent forests has now been proved. The plants were mostly cryptogams—allied to ferns and mosses—but there were also many conifers like firs and pines.

In the Carboniferous beds, to which the British coal measures belong, we have the remains of forest upon forest. Land shells were also found.

The next great group of rocks is the Mesozoic series, or "medium-aged-life" series. The lowest layers of these, the Triassic rocks, contain few fossil remains. The hardened sandstone, however, contained numerous peculiar footmarks, and diligent search proved that they were made by a great frog-like creature whose remains were subsequently discovered. This was called the Labyrinthodon, from the intricate markings found in the transverse section of its teeth.

Passing from the Triassic formation to the Oolite beds, we reach the remains of the oldest known mammal—the Microlestes, probably an animal like the kangaroos and opposums. Remains of reptiles, however, are so abundant in Oolitic rocks that the Oolitic period has been called the "age of reptiles." In this formation also are found in great abundance creatures related to the modern nautilus. Their spiral shells are known as Ammonites, and some of them are very large. There are also numerous tapering cylindrical remains, called Belemnites, which belonged to creatures like modern cuttle-fish.

We have not space to trace the more recent or Eocene fossils, but we may say that they tend to approach modern forms. A few years ago a dead mammoth was found frozen in the ice of Siberia, and its flesh was so fresh that the wolves devoured it, although it had been dead for ages.

PREPARATION FOR PUBLIC EXAMINATIONS.

THE HISTORICAL NOVEL.

SEVERAL correspondents have asked for a list of historical novels which they should read. The number is too great, the selection so wide, that it is impossible to give an exclusive list, but the following are all of them well worth reading. Care must be taken not to consider the historical novel as a text-book. A good writer may be relied on to give an accurate picture of the life of the time, to weave the incidents of history into the exploits of the hero, but it must not be assumed that every incident is history or that every character had a real existence. Some apparently historical novels are pure romances; but a good writer finds "history more wonderful than fiction," and studies deeply all that can be read of the period, and thus succeeds in giving an accurate picture of the age about which he is writing.

The books are classified into periods.

ANGLO-SAXON.

Beric the Briton	Henty	Roman invasion.
Edol the Druid	Kingston	Early Christianity.
Count of the Saxon Shore	Church	End of Roman rule and departure of Romans.
A Thane of Wessex	Whistler	Danish invasion in time of Alfred.
Dragon and Raven	Henty	Days of Alfred.
Edwy the Fair	Crake	Times of Dunstan.
Alfgar the Dane	Crake	Saxon England—time of Edmund Ironside.
Harold	Lytton	Reign and death of Harold.

NORMAN ENGLAND.

Hereward	Kingsley	The stand of the last of the English.
Wulf the Saxon	Henty	Norman Conquest.
Days of St. Anselm	Hollis	Time of William II.
Brian Fitz-Court	Crake	Contest of Stephen and Matilda.

PLANTAGENETS.

Ivanhoe	Scott	Richard and John.
Talisman	Scott	Richard and Third Crusade.
Richard Yea and Nay	Hewlett	Richard I.
Forest Days	G. P. R. James	Robin Hood.
A Clerk of Oxford	E. Everett-Green	Barons' Wars.
Siege of Kenilworth	Stanhope	Barons' Wars.
Chevalier with the Splendid Crest	Maxwell	Time of Edward II.
Scottish Chiefs	Porter	Wallace and his times.
Days of Bruce	Aguilar	Wallace and his times.
Lances of Lynwood	Yonge	Wars of the Black Prince.
The White Company	Doyle	Wars of the Black Prince.
Merrie England	Ainsworth	The Peasants' Revolt.
A March on London	Henty	The Peasants' Revolt.

LANCASTRIAN AND YORKIST.

Agincourt	James	Dealing with the war in France.
Last of the Barons	Lytton	Wars of the Roses.
Malvern Chase	Symonds	Wars of the Roses.
Black Arrow	Stevenson	Richard III.

TUDOR.

A Trusty Rebel	Clarke	Henry VII.
Windsor Castle	Ainsworth	Henry VIII.
The Armourer's Prentices	Yonge	Henry VIII.
The Cloister and the Hearth	Reade	Renaissance.
Church and King	Green	Reformation.
The Tower of London	Ainsworth	Lady Jane Grey and Mary.
Robin Tremayne	Holt	The Marian Persecution.
Kenilworth	Scott	Court of Elizabeth.
Westward Ho!	Kingsley	The sea dogs of Elizabeth.
Dorothy Vernon	Major	Times of Elizabeth.
Walter Tretawin	J. S. Fletcher	Spanish Armada.
The Monastery	Scott	Mary Queen of Scots.
The Abbott	Scott	Mary Queen of Scots.
The Queen's Maries	Melville	Mary Queen of Scots.
The Queen's Quhair	Hewlett	Mary Queen of Scots.

STUART.

Fortunes of Nigel	Scott	Court life, James I.
Guy Fawkes	Ainsworth	Gunpowder Plot.
At Oxford with the King	Church	A tale of the Civil War.
Children of the New Forest	Marryat	A tale of the Civil War.
Legend of Montrose	Scott	A tale of the Civil War in Scotland.
The Splendid Spur	Quiller Couch	A tale of the Civil War.
To Right the Wrong	Edna Lyall	A tale of the Civil War (Hampden).
Woodstock	Scott	Commonwealth.
Simon Dale	Anthony Hope	Charles II.
When London Burned	Henty	Charles II.
Old Mortality	Scott	The Scottish Covenanters.
Lorna Doone	Blackmore	James II. and Monmouth's Rebellion.
Micah Clarke	Doyle	James II. and Monmouth's Rebellion.
Esmond	Thackeray	Time of Anne and Marlborough.
The Cornet of Horse	Henty	Time of Anne and Marlborough.

HANOVERIAN.

Waverley	Scott	Rebellion of '45.
John Splendid	Neil Munro	Claverhouse and his times.
Rob Roy	Scott	Jacobite conspiracies.
The White Cockade	Grant	The Rising in 1745.
Peg Woffington	Reade	Dealing with the stage, etc.
Held Fast for England	Henty	Defence of Gibraltar.
With Wolfe in Canada	Henty	Conquest of Quebec.
The Virginians	Thackeray	American War of Independence.
Richard Carvel	Winston Churchill	American War of Independence.
Captain Jack	Knight	Seven Years' War (Fort Duquesne).
At Aboukir and Acre	Henty	Nelson's time.
Romance of War	Grant	Peninsular War.
Jack Archer	Henty	Crimean War.

There are many other books dealing with other matters than English history which should, if possible, be read—for example,

Flotsam	Merriman	A tale of the Indian Mutiny.
The Jacquerie	James	The Peasants' rising in France (Edward III.).
Quentin Durward	Scott	Times of Louis XI.
For the Cause	Weyman	Henry of Navarre.
The Three Musketeers	Dumas	Cardinal Richelieu and his rule.
The Red Cockade	Weyman	French Revolution.
On the Edge of the Storm	Roberts	French Revolution.
Schönberg-Cotta Family	Charles	Reformation in Germany.
Darkness and Dawn	Farrar	Rome at the time of Nero.
Quo Vadis?	Sienkiewicz	The burning of Rome and progress of Christianity.
The Gladiators	Melville	Rome and Jerusalem.
Antonina, or the Fall of Rome	Collins	The taking of Rome.
Romola	George Eliot	Florence at the time of Savonarola.
Burgomaster's Wife	Ebers	Siege of Leyden.
Hypatia	Kingsley	Egypt and Neo-Platonism.

ESSAYS AND ESSAY WRITING.

The best essay submitted during the month was that by Miss M'Arthur, Pension Rosenkranz, Weimar, to whom a volume of Dickens has been sent. Other very good essays were those of H. Atherton, Miss Renwick, H. D. Coates, E. King, Miss Tiplady. The majority of the others were mediocre, evidently laboured productions, the effort to write grand language being painfully apparent. Ideas must be naturally and easily expressed, even if the words employed are of one syllable. "I ultimately arrived at my destination" is no better or clearer than "I at last reached home." Another mistake often made in the essay on a holiday was the careful statement of the obvious: "At last the train reached the station;" "The day at length drew to an end;" "Needless to say we experienced a variety of weathers" (Why say it, R. J.?).

A smaller number than usual of answers to test questions were sent in, holiday-time probably being spent in other ways than searching for quotations.

Essays for the Month.

Write one or two essays each week on such subjects as the following. (If sent direct to Mr. Arthur T. Flux, The Elms, Coleraine Road, Blackheath, London, S.E., together with a stamped addressed envelope, they will be marked and returned. A volume of the New Century Library will be sent to the writer of the best essay.)

(*a*) Why are Civil Service appointments competed for so keenly?

(*b*) Professionalism in athletic sports.

(*c*) The effects of education upon the industries of a nation.

(*d*) Nelson—his character and work.

(*e*) A bird in the hand is worth two in the bush.

(*f*) Canada as a field for emigration.

(*g*) The National Debt.

(*h*) Hope.

Read up the subject if necessary. Arrange a skeleton plan or outline before you commence to write, and express yourself naturally in the best—not necessarily the most flowery—language at your command. Read your essay *aloud* when it has been written. This will often reveal weaknesses which the eye has not detected, especially in the balance of sentences.

The following notes may assist.

(*a*) In seeking an appointment one is naturally influenced by many motives, the chief being (1) adequate remuneration, (2) reasonable prospect of security of tenure and promotion, (3) congenial surroundings and work, and (4) not too long hours per day. In each of these particulars the Civil Service gives complete satisfaction. The salaries are not high, but they automatically increase, and there is adequate pension after long service; the work is not particularly exhausting or difficult; the hours compare favourably with those in private businesses, and there is a certain status which is also an attraction. Hence it is not to be wondered at that thousands of candidates present themselves for comparatively few appointments.

(*b*) Athletic sport is a natural outcome of a healthy race. The demands made by modern life upon the mental powers necessitate exercise being taken; and as man is a gregarious animal, the exercise is more pleasant when taken in company with others. Emulation, or the desire to excel, is also a natural feeling; so that sports of all kinds inevitably lead to competition. A game of tennis may be played by oneself against a blank wall, but it is a poor occupation compared with contesting for superiority with an active opponent. Competition is healthy and pleasant, but when carried to excess it is deleterious. When the desire to succeed instead of the wish to benefit becomes the dominant factor, evil creeps in. Men are paid to play, and thousands flock to see them who would be much better employed if they were engaged in games themselves. A football enthusiast very frequently is well skilled in the names and form of all the leading players in the country, and yet could hardly run the length of the field without being rendered breathless. Professionalism, if taken as a means of teaching, is good; if considered as an exhibition merely, pernicious.

(*c*) The student will readily detect these. Education pays. Not only does an educated workman turn out better work than an uneducated one, but clever men create new industries.

(*d*) Read Southey's life of Nelson. Nelson's work was perhaps more valuable to England than Wellington's. Without the former the latter would have been impossible. On three occasions when Napoleon's genius had formulated plans which would have been disastrous to England, it was Nelson who frustrated them. The dream, and not at all an impossible one, of conquering and "holding the gorgeous East in fee" was dispelled by the Battle of the Nile; the plan of uniting the northern seapowers against England was destroyed at Copenhagen; and the long and carefully-planned invasion of England—with medals to commemorate it ready struck—was rendered impossible at Trafalgar, where the French and Spanish fleets were not merely defeated, but destroyed. As a man, Nelson was like other men—a compound of good and bad. Absolutely fearless, he inspired his men with the same feeling; rigid in the performance of his duty to the country, he exacted an implicit obedience from his subordinates; of a naturally kind and gentle disposition, he knew when to relax the severity of discipline. He had that magnetic charm which created in his men an absolute belief in ultimate victory—in itself half the battle—and which made him the darling not only of the fleet but of the whole people. Of his weaknesses one need say little: the dark spots on the face of the sun are unnoticed in the general brilliance.

(*e*) A proverb has been defined as "the wisdom of many and the wit of one"—the general opinion of the race crystallised in words by the individual. But proverbs must not be slavishly accepted as absolutely true. "A certainty is better than two uncertainties" seems at first sight incontestable, but it is contradicted by another proverb—"Nothing venture, nothing have." Recklessness is bad, but excess of care and precaution is as bad, or worse. Had every one acted in the spirit of this proverb, the world would be the poorer by many of its great inventions and discoveries. Read Lamb's charming essays on some of these proverbs.

(*f*) Little assistance is needed here. Canada possesses everything which could tempt an emigrant of the right class. Its natural wealth is boundless; its fisheries, forests, rich prairie land, valuable deposits of mineral wealth, natural water communication, bracing climate, are all waiting for millions of hard-working men to utilise and develop.

(*g*) It is a question which always meets the student of history, "How can England be as prosperous as it is with a debt of £700,000,000 hanging like a millstone round its neck?" At first sight it seems impossible, but a little examination and thought will show that things are not so bad as they seem. In the first place, England is in debt to *itself*, and not to other countries. The Consols are mainly held by English investors, and the money collected to pay the huge annual interest is paid out to people in England, and does not leave the country. Again, the proportion of debt to national income is small. It has been estimated that the national earnings amount to £1,400,000,000. Of this, £26,000,000—the annual charge—is but a trivial matter. A debt adds to the security of the form of government. The thousands of investors in national stock would strenuously oppose any revolution which might deprive them of the money invested. And, lastly, it is but right that the heavy expenses involved in a few months for the ultimate good of the country should be shared by those who will benefit, and thus extended over many years.

(*h*) An essay on this is fairly obvious. Hope is the mainspring of this life. It is the most powerful of all motives. Without it effort and determination would be paralysed. A hopeless man is utterly useless.

Test Questions in General Intelligence.

Answers will be marked and returned if a stamped addressed envelope is enclosed.

1. Explain the use of contour lines, and draw a map of an island, roughly oval in shape, having a hill 700 feet high at the north and one 300 feet high in the south.

2. Explain the gain or loss of a day in travelling round the world, and why we see only one half of the moon.

3. Where do the following people live?—Czechs, Copts, Tchukchkis, Samoyedes, Cingalese, Dyaks, Pondos.

4. Complete the following quotations, and say where they occur:—

(*a*) The evil that men do.....

(*b*) There were two fathers in that ghastly crew.....

(*c*) But war's a game which, were their subjects wise.....

(*d*) The abuse of greatness is.....

(*e*) 'Tis one thing to be tempted.....

(*f*) 'Tis better to have loved and lost.....

5. In what works do the following characters appear?—Malvolio, Sir Nigel Loring, Tom Thurnall, Grimes, Balafré, Col Everett, Tito Melema, Roger Wildrake.

Lessons in English Language and Literature.—II.

The Anglo-Saxon period was not productive of much material in the way of literature. The reasons are not far to seek. It was to the educated churchman one must look to enter upon the laborious work of writing or copying a book; and as the Anglo-Saxon Church was—in spite of the efforts of Dunstan—notoriously lax and lazy, very little was done. Numerous ballads were

doubtless handed down from father to son, but few of them have been printed. One of the earliest is the *Beowulf*, which was undoubtedly brought from the Continent. Caedmon's *Paraphrase of the Old Testament* and *The Song of Brunanburg* are the other chief Anglo-Saxon specimens. Bede's works are mainly written in Latin, although he translated some of the gospels into Anglo-Saxon. The best-known compilation, however, is the famous *Anglo-Saxon Chronicle*, commenced by Alfred, and continued down to Plantagenet times.

The Norman Conquest had as much influence upon the language as it had on the people. For many years there was a strife of tongues as there was one of races, and in each case the result was a fusion—the formation of a new race and language compounded of the characteristics of each. The new language which resulted from the strife is properly called "English," for the Anglo-Saxon element formed the greater part. It was the language of the hearth and home, as may be clearly seen to-day, for the talk of children and uneducated people is practically pure Anglo-Saxon.

The chief changes which resulted from the strife were—

1. The language lost most of its inflections, in which it had been rich. Inflections for the plural number and the possessive case of nouns remained, and a few inflections of inflection for gender, but a comparison between the inflection given in the last paper and the noun as used to-day will show what was dropped.

2. The language lost to some extent its power of compounding words, and many of the Anglo-Saxon compounds were replaced by Norman-French words. Some of the lost compounds were forcible. For example, "the agenbite of inwit" = "the remorse of conscience;" "wanhope" (waning hope) is better than "despair."

3. As a balance to these losses there was a large increase in the vocabulary; and as the Norman-French was derived from the Latin, this is called the "Latin of the Third Period." The words of a people depend upon their ideas, and an increase in ideas means an increase in the words to express them. As the conquering race were more civilised and advanced, they brought many new ideas and new words with them. The Anglo-Saxon possessed little power of generalising. Father, mother, son, brother, are Saxon, but *relation* is Norman-French; red, white, blue, green, are Saxon, but *colour* French; tear, joy, hope, sorrow, are Saxon, but *emotion* French; run, sing, jump, speak, are Saxon, but *action* French, etc. Words relating to the feudal system, to architecture, to the Church, to the chase, to the law courts, were introduced, since the ideas had not previously existed.

It is comparatively easy to detect the majority of words coming from the Anglo-Saxon.

(*a*) Nearly all monosyllables are of Saxon origin; only about three hundred are not.

(*b*) Nouns which have irregular plurals, those which form the plural by vowel change, strong verbs, are all Saxon.

(*c*) The pronouns, nearly all the prepositions, the conjunctions, the cardinal numbers, the distributive adjectives, are taken from the Saxon.

(*d*) Words descriptive of simple actions, common things, and common attributes are generally of Teutonic origin.

TECHNICAL TRAINING OF THE RANK AND FILE.*

BY J. G. LEGGE, M.A., DIRECTOR OF EDUCATION TO THE LIVERPOOL EDUCATION COMMITTEE.

THE public is more alive to-day than ever it was to the necessity of technical training, but the avowed end is often merely the training of captains of industry, to the neglect of the rank and file. The need of capable and resourceful workmen is quite as great as that of experienced foremen and scientifically trained managers or directors. Moreover, the workman should be furnished with such an equipment in boyhood as will enable him by steadiness and by study in youth and early manhood to rise through the ranks of foremen to that of manager or director.

But the public is still perplexed to some extent by a confusion in educational ideals. This confusion may be traced all through the history of the theory and practice of education, and is due to the continual conflict between the intellectual and the practical ideals of education. One party has always laid stress on giving all children what is called a liberal education, interpreting this as an education which is largely literary and linguistic, and if it has any direct bearing on the future occupation of a child points to a professional or commercial career, not that of any horny-handed son of toil or mechanic. The other party has considered the main business of education to be the training of a child to follow the line of life circumstances are likely to necessitate, and mistrusts the introduction into school of subjects which might tend to give the child a distaste or to unfit it for such employment as is likely to fall to its lot. The real problem in education is now, as always, how to effect a compromise between the two ideals. To make the ladder of education a real one, one must see that the bottom rungs are there, so that the child, from the very depths, can step on to it without having to be hoisted. The circumstances of many children demand that their manual activity shall be just as carefully cultivated from early years as their intellectual faculties; hence the need for dove-tailing into one another the industrial and the literary or intellectual elements of their training. Consideration ought to be given to the bearing on this point of the change in the relation of the home both to school and to work, brought about by the industrial development of the last century.

Evidence of the value of industrial training is afforded by a study of the movement in schools under the control of the Admiralty, the War Office, the Home Office, the Local Government Board, and various voluntary associations for the care of orphans and the like. It is clear that what is known as hand-and-eye training and weekly lessons making up a course of manual instruction or handicraft are inadequate. The main ideas underlying all satisfactory schemes of industrial training are the following every one of which requires full attention:—

(1.) The acquisition of the workman's touch.
(2.) The art of handling every tool of a trade to the best advantage.
(3.) The full understanding of the materials one has to work upon.
(4.) The capacity to plan out as well as to execute a piece of work.

It should not be difficult to devise a curriculum for elementary schools alternative to the literary and commercial curriculum generally pursued. The first step towards this curriculum would be to divide a school day clearly into two sessions, the morning session being devoted mainly to the literary and intellectual side, covering such subjects as English, arithmetic, writing, geography, history, and the laws of health; and the afternoon session to what may be called the practical and recreative and constructive elements—drawing, singing, physical training, manual work of the most varied kind—affording full scope for originality both in teacher and child, and including housewifery for girls. It should be clearly understood that there is to be correlation between such subjects as arithmetic taken in the morning and such manual work, whether by boys or by girls, as is taken in the afternoon, and similarly between any instruction in elementary science and the manual occupations taken. Demands for such a curriculum were recently put forward by the Physical Deterioration Committee in its report; by Professor Sadler in his presidential address to the Educational Science Section at the meeting of the British Association in 1906; and by the president of the National Union of Teachers at the annual conference in 1907.

Incidentally, the advantage of such a curriculum will lie in the improvement of the conditions of the classes of the population most exposed to physical deterioration, and in helping to counteract some of the deadening influences too often involved in the conditions of modern industry. For the principle at the root of such a curriculum high authority can be quoted. There are physiologists of eminence who are ready to support Mr. C. G. Leland's contention that "from seven to fourteen years of age a certain suppleness, or knack, or dexterous familiarity with the pencil or any implement may be acquired that diminishes with succeeding years;" and the following maxim from Goethe is worth pondering: "In all things to serve from the lowest station upwards is necessary; to restrict yourself to one trade is best. For the man of narrow mind whatever he attempts is still a trade; for the higher an art; and the highest in doing one thing does all, or, to speak less paradoxically, in the one thing which he does rightly he sees the likeness of all that is done rightly."

* Abstract of a paper read before the Educational Section of the British Association at Leicester, August 1907.

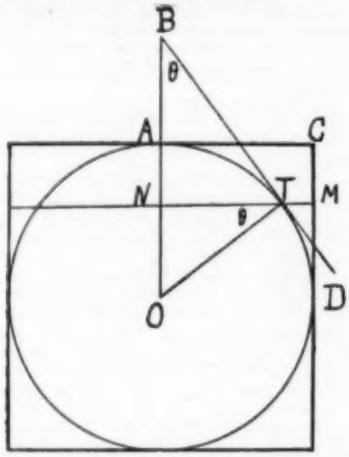
OUR QUERY COLUMN.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Orcadiensis.—On the radius of a circle OA produced take a point B, and through this point draw a tangent BT to the circle. Show how to find for what position of B the surface described by BT and the arc AT, when they revolve round OA as axis, may have to each other a given ratio.



Draw the tangent AC, and CD a tangent parallel to OA. Draw NTM parallel to AC. Join OT. The angle OTN = the angle OBT = θ (suppose).

Then NT = OT cos θ = r cos θ, where r is the radius of the circle, and BT = OB cos θ = x cos θ, where x is the length of OB. The surface described by BT = 2πNT . $\frac{BT}{2}$ = πNT . BT = $\pi r \cos\theta \,.\, x \cos\theta = \pi r x \cos^2\theta$.

Again, from the relation between the surface of a sphere and the surface of its circumscribing cylinder, the surface described by the arc AT is equal to the surface described by CM, when AT and CM are supposed to revolve about OA as axis. Now CM = AN = r − NO = $r - r \sin\theta$ = $r(1 - \sin\theta)$.

Hence the surface described by the arc AT = 2πNM . MC = $2\pi r \,.\, r(1 - \sin\theta) = 2\pi r^2(1 - \sin\theta)$. Let R denote the given ratio. Then

$$\frac{\pi r x \cos^2\theta}{2\pi r^2(1 - \sin\theta)} = R. \quad \therefore \frac{x\cos^2\theta}{2r(1 - \sin\theta)} = R.$$

$$\therefore \frac{x(1 - \sin^2\theta)}{2r(1 - \sin\theta)} = R.$$

$$\therefore x(1 + \sin\theta) = 2rR.$$

But $\sin\theta = \frac{OT}{OB} = \frac{r}{x}$.

$$\therefore x\left(1 + \frac{r}{x}\right) = 2rR.$$

$$\therefore x + r = 2rR.$$

$$\therefore x = (2R - 1)r.$$

Thus the length of OB is determined in terms of r, the radius of the given circle, and of R, the given ratio.

Johnnie.—Find the side of a cube which will exactly stop up a hollow right hexagonal prism whose greatest diameter is one foot.

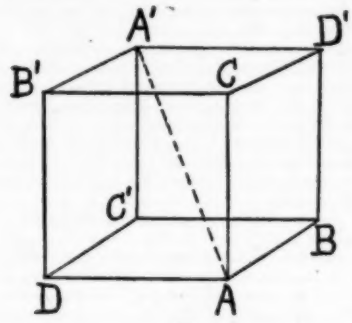


FIG. 1.

Let AA′ be the given cube. Project it orthogonally on a plane at right angles to the solid diagonal AA′. The three edges AB, AC, AD which meet in A are equally inclined to the diagonal AA′, and hence also to the plane of projection. These edges will therefore be projected into equal

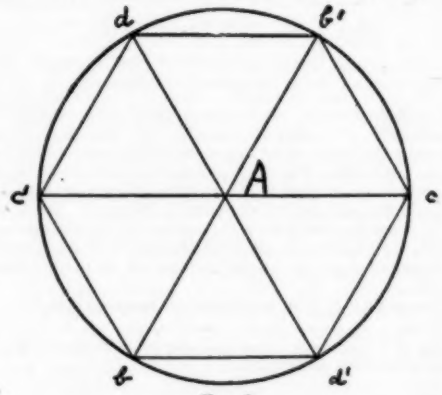


FIG. 2.

straight lines. Also the three planes which connect these edges two and two, having their inclinations complementary

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to the inclinations of the opposite edges, will be equally inclined to the plane of projection; and hence their contained angles—namely, the right angles BAC, CAD, DAB—will be projected into equal angles. These three projected angles, making together the angular space about the projection of the solid angle of the cube at A, are equal to four right angles, and hence each of them is 120°. Let these be A*b*, A*c*, A*d* in Fig. 2.

Again, the opposite solid angle of the cube A′ is projected also in A, and the three edges A′B′, A′C′, A′D′ which meet in A′ are parallel to those already projected, but lying on the opposite side of the diagonal AA′. These have the same inclination to the plane of projection that the first three edges have; hence their projections will be of the same length as the former ones, and be situated in continuance of them. They are represented by A*b*′, A*c*′, A*d*′ in Fig. 2.

Lastly, the remaining edges being those which join the points already projected, we have only to join *bd*′, *d*′*c*, *cb*′, *b*′*d*, *dc*′ *c*′*b*, to obtain the projection of the entire cube.

It is obvious therefore that the projections of all the edges of the cube lie in the sides and diagonals of a regular hexagon, the edges which meet in the diagonal A′A forming the three diagonals, and the remaining edges the sides, of the hexagon. It follows therefore that if a hollow right hexagonal prism be taken, a cube can be found such that when a solid diagonal of the cube is made to coincide with the axis of the prism, the cube will exactly stop up the prism.

To find the relation between the edge of

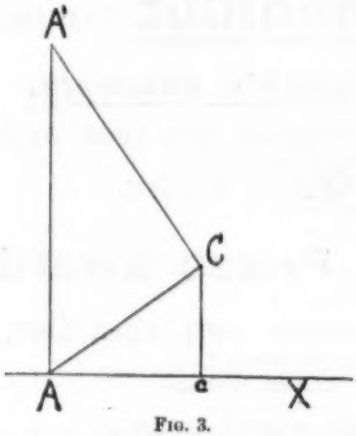


FIG. 3.

the cube and the diameter of the hexagon, take A′A (in Fig. 3), equal to a solid diagonal of the cube. Draw AX at right angles to A′A, and in the same plane with AA′ and AX complete the triangle ACA′, making AC equal to an edge of the cube, and A′C equal to the diagonal of a face of the cube. Draw C*c* perpendicular to AX. Then A*c* in Fig. 3 is obviously equal to A*c* in Fig. 2.

Since A′CA, A′A*c*, C*c*A are all right angles, it is easily seen that AC : A*c* :: AA′ : A′C.

But AA′ : A′C : CA :: $\sqrt{3}$: $\sqrt{2}$: 1, since AA′, A′C, CA are respectively the solid diagonal, the diagonal of a face, and the edge of a cube.

Therefore AC : A*c* :: $\sqrt{3}$: $\sqrt{2}$.

$$\text{Hence AC} = \frac{\sqrt{6}}{2} \cdot \text{A}c.$$

But, by the question, A*c* = half a foot.

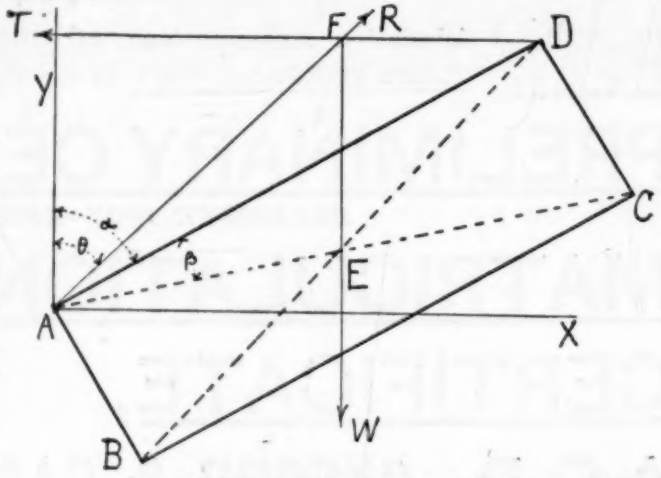
$$\text{Therefore AC} = \frac{\sqrt{6}}{4} \text{ feet.}$$

Hence a cube whose edge is $\frac{\sqrt{6}}{4}$ feet will exactly stop up the given hollow prism, when a solid diagonal of the cube is made to coincide with the axis of the prism.

F. W. B.—A rectangular board ABCD is hinged at A, so that its plane is vertical, and is supported by a horizontal string attached to the highest point D. Given AD = *a*, AB = *b*, and that AD makes an angle α with the upward vertical, prove that the reaction at A makes with the upward vertical an angle

$$\tan^{-1} \tfrac{1}{2}\left(\tan \alpha + \frac{b}{a}\right).$$

(Tutorial *Statics*.)



Let E be the centre of gravity of the board, and let F be the point of intersection of the horizontal string and the vertical through E. Then the reaction at A must pass through F. Let θ denote the angle which the reaction at A makes with the upward vertical. Denote the angle DAC by β. Let W be the weight of the board, T the tension of the string, and R the reaction of the hinge.

Since the forces W, R, T are in equilibrium and the sides of the triangle TAF are parallel to their directions, we have W, R, T proportional to the sides TA, AF, FT. Hence

$$\frac{\text{T}}{\text{W}} = \frac{\text{FT}}{\text{TA}}.$$

$$\therefore \frac{\text{T}}{\text{W}} = \tan \theta. \quad \ldots\ldots\ldots \quad (1)$$

Again, taking moments about A, we have

$$\text{T} \cdot \text{AD} \cos \text{YAD} = \text{W} \cdot \text{AE} \sin \text{YAE}.$$

$$\text{But AE} = \tfrac{1}{2}\text{AC}.$$

$$\therefore \text{T} \cdot \text{AD} \cdot \cos \text{YAD} = \tfrac{1}{2}\text{W} \cdot \text{AC} \sin \text{YAE}.$$

$$\therefore \frac{\text{T}}{\text{W}} = \tfrac{1}{2}\frac{\text{AC}}{\text{AD}} \cdot \frac{\sin(\alpha + \beta)}{\cos \alpha}.$$

$$\therefore \frac{\text{T}}{\text{W}} = \tfrac{1}{2} \cdot \frac{1}{\cos \beta} \cdot \frac{\sin(\alpha + \beta)}{\cos \alpha}. \quad (2)$$

From (1) and (2) we have

$$\tan \theta = \tfrac{1}{2}\frac{\sin(\alpha + \beta)}{\cos \alpha \cos \beta}.$$

$$\therefore \tan \theta = \tfrac{1}{2}(\tan \alpha + \tan \beta).$$

$$\text{But } \tan \beta = \frac{\text{DC}}{\text{DA}} = \frac{b}{a}.$$

$$\therefore \tan \theta = \tfrac{1}{2}\left(\tan \alpha + \frac{b}{a}\right).$$

$$\therefore \theta = \tan^{-1} \tfrac{1}{2}\left(\tan \alpha + \frac{b}{a}\right).$$

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THE EDITOR'S BOOKSHELF

ON TEACHING CHILDREN TO READ—A GRUMBLE.

THERE is a growing belief, although it is heresy to express it, that our primary education is to some extent a failure, and that, as a nation, we are not getting the worth of the money expended on it. As Mr. George White, M.P., said, in his presidential address to the Association of Education Committees, the expenditure from rates alone has gone up during the past four years over £4,000,000, while the standard of education, so far from having advanced, has actually gone back. The manner in which the statement was received by the hundreds of specialists in education present showed that the belief is fairly common. We do not teach our children to *think* for themselves. Their minds are cribbed, cabined, and confined; their instruction is given in tabloids; their education is often the merest veneer, which wears off rapidly, and discovers the crude material beneath. I admit at once the difficulties with which teachers are faced in the form of large classes, cast-iron regulations, and multiplicity of subjects, and also that there are schools where the standard of education has improved; but the fact remains that, generally speaking, much more might be done than is done to turn a boy or girl out of school ready to take his or her part in the battle of life. After all, school life is only the period when a child is learning *how* to learn; every successful man will admit that nearly all that he knows that has been of use to him has been learnt since leaving school. A child is taught *how* to read, but not *what* to read—too frequently his class teacher is unable to give him the information. In many schools there are the regulation history reader, geography reader, and literary reader, the latter consisting of snippets more or less interesting, or of a "continuous" story from which everything difficult has been eliminated. These books are read, re-read, and explained till they become not only uninteresting but nauseating, with the result that children leave school (1) with a positive distaste of any serious reading; (2) having never acquired the habit of doing things for themselves, with a total helplessness to continue their own education. They read, certainly, but mainly papers and journals which cater especially for them by providing short, exciting "bits" of reading, requiring perhaps as much as a minute's continuous thought. As the wiser of them advance in years and they sicken of such diet, they turn to the great books which have been waiting for them, and enter on the path along which they should have advanced some way before leaving school.

There must come a period in every one's life when they drop the leading strings and walk alone, and the sooner this period is reached the better; and there is no reason at all why children in the senior classes of any school should not be trusted to work for themselves, especially in the matter of reading. If they meet with difficulties—as they will—they must be encouraged to attack them unaided, the teacher's assistance being called for as a last resource. The old school motto, "If at first you don't succeed, try again," has been replaced by "If at first you don't succeed with a minimum of effort, turn to something else, or ask the teacher." The average child is most anxious to learn, and the distaste frequently evinced is not caused by the subject itself, but by the manner in which it is presented. It is by reading we learn, not by being lectured to; it is what we read with pleasure that we remember most easily; it is what we master by our own efforts that gives us the keenest joy, and the greater the effort the greater the joy. Without asserting that the man who reaches the topmost rung of the ladder has read most books, it is safe to say that the man who remains at the foot all his life reads none. Once a child has acquired a taste for reading good books, he will continue to read.

The first step towards this desirable end is to introduce the child at school to good books, and allow him to read them to himself. The teacher can give any necessary directions as to what to look for in the book, and can, by questioning, easily ascertain whether the pupil has grasped the meaning of what has been read, and supply any comments or additional information which may prove necessary. There is no difficulty in selecting suitable books, and the cost is trifling. Messrs. T. Nelson and Sons have recognised this need, and are producing a series of books—"Short Studies in English Literature"—well bound in stiff boards, at the price of sixpence each. The series includes Hawthorne's *Great Stone Face*, Irving's *Sleepy Hollow*, an Introduction to Shakespeare's Tragedies, Wordsworth's Shorter Poems, Carlyle's *Hero as Divinity* and Arnold's *Balder Dead*, pen pictures from Macaulay, Lamb's *Tales*, selections from Tennyson, pen portraits from Carlyle, Longfellow's *Evangeline*, Introduction to Shakespeare's Comedies, etc. These books will supply food for thought of the right kind, and many children would be only too ready to buy the books for themselves, and thus form the nucleus of a useful library.

A School Algebra. By F. Gorse, M.A. (*Cambridge University Press.*)

The writer of this book has followed the tendency to require the teacher to supply all the instruction orally, and treat the text-book merely as a collection of examples. The result of this is too frequently to lead the pupil to be content with just a sufficient knowledge of principles to enable him to work examples, and to leave him unable to pursue his studies later on from text-books. The collection of examples before us is an admirable one, and in the hands of a competent teacher will be a powerful aid to a systematic treatment of the subject. There are, however, weak teachers and private pupils among us for whom the book does not afford much help. Thus in the examples on substitution (page 32) the pupil is required to find the value of fourteen different arithmetical series, but the formula in which the substitutions have to be made is not given. The examples will be especially valued by the teacher who tries to teach algebra inductively, for under his guidance pupils will be able to arrive at the rule by the study of the examples.

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AN UNCONVENTIONAL HISTORY.*

WE hope that the appearance of this second volume of Mr. Fletcher's history means that the first volume, which was published some time ago, has met with the reception it deserved. For at last school history becomes a living thing, which deals with men and women differing from ourselves only in their environment, and which is, therefore, of absorbing human interest.

The title of this portly volume seems at first somewhat incongruous, but we feel it to be fully justified when we have made closer acquaintance with the contents. The book is an introduction to history proper, intended for boys and girls of the middle and upper forms of our secondary schools; and while treating his young readers with the reverence which is their due, Mr. Fletcher writes on the whole with due knowledge of their special requirements, real sympathy for their limitations, and true acquaintance with their interests. His style, as our readers know, is free, breezy, and at times colloquial. It is good to read, but bad to imitate. We like it because it is Mr. Fletcher, if we may be allowed to say so; but we sincerely hope that it will not become the mode.

It has its dangers, this new style of writing history. Has Mr. Fletcher carefully considered the possibility of his young readers attempting to reproduce his manner in staid examination papers? Distilled through the alembic of a middle-form boy's brain, how will the information conveyed in the following passage be reproduced?—

"The London hackney coachman, or 'cabby,' dates from 1636, but he came into existence as a licensed animal not for the benefit of the British public, but for that of Charles's friend, the Marquis Hamilton. Up till that time the Thames wherries had been the cabs of London: you may imagine what the watermen's language was like when they heard they were to have licensed rivals."

A NEW PLUTARCH.†

MR. BYLES offers us a translation of nine "lives" from Plutarch—is there any significance in the number? He is of the opinion that "for various reasons the existing standard translations of Plutarch are not very suitable for school use," and adds, "The language of North, excellent as it is for students of literature, is too difficult for boys and girls. The translation known as Dryden's, and that by the brothers Langhorne, are somewhat ponderous, and written in a style which we should not nowadays wish our children to acquire." With this we are in cordial agreement. The best possible way to create a distaste for Plutarch is to use the version produced by Dryden's hacks or that of the Langhornes, which has all the artistic faults of the eighteenth century, whose name is Legion.

Mr. Byles's translation is very readable, done in plain English, void of mannerisms, with no straining after effect, and full of a quiet dignity. He has not only translated; he has also abridged the subject-matter—wisely, we think, for Plutarch is no artist. He (Plutarch, not Mr. Byles) is verbose, fond of somewhat irrelevant digressions, and, moreover, has not the slightest trace of dramatic power. He is unnecessarily careful about genealogy, and allows the attention of the reader to be frequently called away from the central figure. To a certain appreciable extent Mr. Byles corrects these tendencies by selection of striking episodes and suppression of the unnecessary.

The lives selected are those of Theseus, Lycurgus, Aristides, Themistocles, Pericles, Alcibiades, Dion, Demosthenes, and Alexander. Short footnotes are given which the teacher will enjoy and appreciate better than the pupil. There is also a useful explanatory index of names, with hints for pronunciation of those likely to be rendered incorrectly by non-classical readers. Altogether a creditable and useful piece of work.

A CHARMING ANTHOLOGY.*

TEACHERS who wish to introduce their senior pupils to the treasures of English poetry in the pleasantest possible manner are recommended to use this new anthology, which is the work of an experienced teacher and a discriminating lover of the best in English verse. The selections range from the poetry of the seventeenth century to Kipling, Henley, Watson, Newbolt, and others of the best modern writers. Many old favourites are included, because, to quote from the editor's preface, "a hackneyed poem may generally be regarded as one which boys and girls ought to know." But others are omitted, on the ground that they are too advanced in thought and aim to be appreciated by those whose life lies all before them. The illustrations consist of reproductions from the works of Watts, Murillo, Cope, Guido Reni, Domenichino, and other masters, ancient and modern, and really serve to enhance the value of the text. At the end of the volume there is a useful "commentary" containing notes on allusions in the poems, and an index of first lines.

BOOKS FOR STUDENTS.†

THE student of English who is reading for examinations is always safe if he or she uses the volume published by Messrs. Ralph, Holland, and Company. The present three books are edited to meet a special purpose, and the editors, whose names are a guarantee of careful scholarship, have spared no pains to equip the student with all the information necessary for facing the most searching test which could be applied in an examination room. Here we have in each volume a well-written and comprehensive introduction; complete text printed with due regard for the eyesight of the student; full notes (at the foot of each page in the first two volumes, and after each essay in the third); examination questions, searching, deep, and far reaching; and last but not least a copious index. Moreover, each book is interleaved for the student's own notes and comments. Nothing could possibly be more thorough and complete.

---

* *An Introductory History of England.* From Henry VII. to the Restoration. By C. R. L. Fletcher, Fellow of Magdalen College, Oxford. (John Murray.)

† *Greek Lives from Plutarch.* Newly translated by C. E. Byles, B.A. (Edward Arnold.)

* *The Harp of Youth.* Edited by W. Jenkyn Thomas, M.A. (Vol. II. of "Cameos of Literature.") (Thomas Nelson and Sons.)

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MESSRS. MACMILLAN have just issued a "new and revised edition" of the well-known "Lock's Arithmetic," * and the nature of the revision that has been found necessary is a good guide to the changing opinion on the method of dealing with this important school subject. In this new edition the "Tables" have been simplified by the omission of the pole in Linear and in Square Measure and the introduction of the chain and square chain. No one will regret the disappearance of the pole, which has been responsible for a good deal. Further, the articles dealing with Duodecimals, Scales of Temperature, Chemical Compounds, Equations of Payments, Foreign Coinage, and Exchange, all of which are of a very technical character, have also been omitted, as well as the explanation of Horner's method of obtaining cube roots; while the Theory of Recurring Decimals is postponed to the end of the book: which is all very proper and truly educational. In externals the new edition leaves nothing to be desired.

English Authors for School Reading. (*Blackie and Son.*)

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The Laws of Health: A Handbook of School Hygiene. By Carstairs C. Douglas, M.D. (*Blackie and Son.*)

This is a teacher's book on a subject now occupying the minds of many people interested in school work—to such an extent, indeed, that the agitation threatens to develop a state of nervousness which is the very antithesis to health. Having delivered ourselves of this grumble, we may say that Dr. Douglas's manual is a very readable and interesting summary of the facts with which every teacher would do well to make himself acquainted. The section on children's ailments and diseases is one of the most interesting parts of the book. It is well that the teacher should have some power of diagnosis, lest inability or defectiveness be interpreted as naughtiness, and visited with punishment, the infliction of which might cause lasting regret. There has been too much of this type of punishment in the past. It was due to ignorance, for which in these days there is no excuse.

The Shrew-mouse, Dormouse, House-mouse, Field-mouse, Meadow-mouse, and Harvest-mouse. Photographed from life and described by Douglas English, B.A., Fellow of the Royal Photographic Society of Great Britain, etc.

One Hundred Photographs of Bird Life. By R. B. Lodge, Medallist of the Royal Photographic Society, etc. With descriptive notes. (*S. H. Bousfield and Co., London.*)

These two little manuals are issued as Nos. 1 and 2 of the "Douglas English Nature Books." Their chief feature is the wonderfully successful series of photographs which they contain. A careful examination of these reveals the great advantage which this new mode of nature study and nature representation offers as compared with drawings of the older type, so far as regards the truth to life and the "convincing" character of the pictures. It likewise reveals their relative weakness when an attempt is made to trace points of structure, for it is always difficult, and usually impossible, to secure such a pose of the subject as will show it to the best advantage to one who would learn these points from the photograph. They are admirable books for the young naturalist, especially to one possessed of a camera and of a desire to experiment in this delightful manner of using it.

Character-Forming in School. By Florence H. Ellis. (*Longmans, Green, and Co.*)

This is not a thesis on the above subject, but a practical manual for the use of the teacher, showing how the lessons of the day can be framed and connected to build up the character of the pupil without undue insistence on the moral. Nor are the schemes and notes of lessons the work of a mere bookmaker. They have been used and tested in a large school in Halifax, where, if the practice is as good as the spirit embodied in this volume, the pupils are to be envied. Every teacher interested in definite but unobtrusive ethical instruction ought to see this volume.

Spanish Commercial Practice connected with the Export and Import Trade to and from Spain, the Spanish Colonies, and countries where Spanish is the recognised language of commerce. By James Graham and George A. S. Oliver. Part II. (*Macmillan and Co., Limited.*)

This is in every way an excellent book, and deserves the same unstinted praise we have given to other volumes in the same series. Its excellence does not consist merely in the fact that it gives models of Spanish forms of business letters covering pretty well every transaction and problem which may arise in the conduct of commercial affairs, nor in the fullness of the information it gives for the benefit of English merchants who are trading with Spanish-speaking countries. In planning the book, the authors have made a study of business transactions in Spain as they present themselves to the English exporter and not to the exporter from other countries. Furthermore, the Spanish business letters given are such letters as would actually be written from a Spanish business house, and not merely English business letters as closely translated into Spanish as the differences of the idiom between the two languages would admit. To quote the words of the authors: "A few of the letters may appear sentimental and perhaps somewhat childish to our English insular ideas; but such letters are expected by our foreign customers, and if we wish to trade with Rome, we must write as the Romans write, and not as we think they ought to write; in other words, in Rome we must do as the Romans do." We have no hesitation in expressing our belief that there is no better book of its kind on the market at present.

New French Course for Schools, based on the principles of the Direct Method, combining the practical use of the living language with a systematic study of grammar. By Charles Copland Perry, New College, Oxford, and Dr. Albrecht Reum, Oberlehrer am Vitzthumschen Gymnasium, Dresden. Part II. (*Macmillan and Co.*)

The Reform method of teaching foreign languages has now been so long acclimatised with us that experience has shown us both its strong and its weak points. Accepting its main principles and recognising that they must form the basis of our modern language teaching in the future, it is generally recognised that, along with practice in speaking, there must be definite grammatical teaching, and that the matter presented for reading must be neither below nor above the capacity of the pupils to be instructed, must be interesting in itself, and not too far removed from the experience of those who have to be taught. These considerations have been present to the minds of the authors of this book, which we think is not only an excellent book of its kind, but one which will aid materially in the general mental development of those who use it. Each lesson consists of an exercise for reading, a section on grammar closely connected with the part read, oral and written exercises on the grammar, a dictation exercise, and questionnaires. The extracts chosen for reading are such as would appeal particularly to the pupils of from twelve to fifteen years of age, for whom the book is written, and the authors have made a great point of asking for definitions of out-of-the-way words. Used in accordance with the suggestions given in the authors' admirable preface, a class cannot fail to get a solid knowledge of French grammar and idiom.

NEXT MONTH.

The Literary Editor of the *Practical Teacher* has received from the various publishers a large number of new publications intended for use in the teaching of English. As this subject is at present occupying the attention of all progressive teachers, he hopes to pay special attention to this kind of school book in the November issue. Ready October 25th.

* *Arithmetic for Schools.* By Rev. J. B. Lock, M.A., and V. M. Turnbull, M.A. New Edition, revised and enlarged. (Macmillan & Co., Ltd.)

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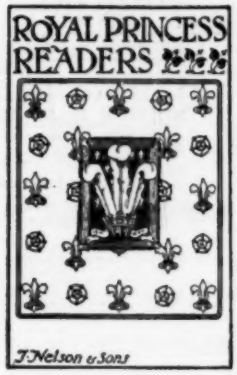

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